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Construction Methods and Equipment

McGraw-Hill Publishing Company, Inc.

May, 1939

Price 20 Cents

VACUUM MATS connected by hose lines to manifold and suction pump remove excess water from concrete on U. S. Housing Authority's $12,000,000 Red Hook Houses in Brooklyn, N. Y.

MASS HOUSING—Red Hook project of 2,500 dwelling units in Brooklyn, N. Y., built with aid of vacuumized concrete and twisted dual-bar steel reinforcement.

CONCRETE BARREL ARCH of 112-ft. span, 1,118 ft. long, and thin precast exposed aggregate concrete panels house Navy's new ship-model testing basin.

EMPLOYEE SAFETY is objective of state-wide program of Illinois Division of Highways.

GRADE SEPARATION VIADUCT, with caisson piers under two 233-ft. truss spans, eliminates traffic bottleneck.

WINDOWLESS BUILDING with "golf-tee" concrete columns, is air-conditioned and "breathes" through two "nostrils".

Jobs Move Along Smoothly

. . . With Inland's Aggressive Service

There's a strong and increasing tendency, indicated by Inland's records, to use Inland service *during the earliest planning stages* of construction work. More and more, Inland engineers are being called in at a time when their specialized experience can be most valuable.

Just as a contractor, fabricator or worker becomes expert through constant handling of certain kinds of jobs, so these Inland men are experts in getting the utmost value out of every ton of steel. They *live* with steel. Their range of experience covers every form of construction in which steel is used. Following through, they are able to co-ordinate mill deliveries with your scheduled requirements.

This service can prove important to you in many ways. It saves time. It gives you complete confidence that there will be no waiting for steel. Often it results in worth-while cost reductions that put money back into your pocket.

You are invited to use this service regularly, without any cost or obligation.

Rugged, uniform Inland Piling makes quick work of water control jobs. Inland Piling Book illustrates interesting examples.

Inland 4-Way Traffic Plate combines safety with durability of bridge treads, crossings, platforms, etc. Write for 16-page Inland Floor Plate Book.

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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

TECHNOLOGY DEPT

CURRENT JOBS

. . . . and Who's Doing Them

BUILDINGS

Public — For a jail at Taxarkana, Ark., **Manhattan Construction Co.**, of Muskogee, Okla., bid $303,482. A $565,700 post office will be built in Fresno, Calif., by **J. I. Barnes Construction Co.**, of Santa Monica, Calif. Another post office in Los Angeles, costing $461,500 is under construction by **Baruch Corp.**, local contractor. Successful bidder for a housing project in St. Petersburg, Fla., was **I. E. Millstone Construction Co.**, of St. Louis, Mo., with tender of $649,900. General contract for state hospital building at Milledgeville, Ga., went to **Beers Construction Co.**, of Atlanta, for $685,479. A high school costing $820,300, in Rockford, Ill., will be built by **U. S. Fireproofing Co.**, of Chicago. Bloomington, Ind., has engaged **Henke Construction Co.**, of Chicago, to build a $592,578 music hall. In New Orleans, La., the Thomas Street housing project will be completed at cost of $3,678,000 by **Henry Ericsson Co.** of Chicago. Successful contractor for housing project in Omaha, Neb., to cost $1,973,000 was **Peter Kiewit Sons Co.**, of Omaha. **G. Siegler, Inc.**, of Jersey City, N. J., will build a $488,000 isolation hospital in that city. A new city hall for Elizabeth, N. J., is under construction by **Andrew Christensen**, of Elizabeth, N. J., at cost of $418,000. A bid of $479,000 obtained housing project in Syracuse, N. Y., for **W. J. Burns Construction Co.**, local contractor. Utica, N. Y., municipal housing project went to **William L. Crow Construction Co.**, of New York City, for $534,960. **Turner Construction Co.**, of New York, is building at Brentwood, N. Y., hospital buildings to cost $2,556,000. Foundation contract for New York City criminal court building went to **Spencer, White & Prentis**, local contractors, for $2,020,000. **Caye Construction Co.**, of Brooklyn, **N. Y.**, bid in for hospital buildings at St. George, N.Y., for $1,109,400. Concrete auditorium in East Lansing, Mich., to cost $933,967, will be built by **Reniger Construction Co.**, of Lansing. Contractor for Veterans hospital in Fayettesville, N. C., to cost $1,020,000, is **N. P. Severin & Co.**, of Chicago. Low bidder for Bedford housing project in Pittsburgh, Pa., was **Mellon-Stuart Co.**, of Pittsburgh, with price of $1,306,000. In Washington, D. C., **John McShain Co.**, of Philadelphia, will build superstructure for Thomas Jefferson Memorial at cost of $2,159,300. New court house at Seattle, Wash., went to **N. P. Severin**, of Chicago, for $1,227,000.

Industrial — Soap plant for **Lever Bros.**, at Edgewater, N. J., will be built by **Stone & Webster, Inc.**, of New York City, for $1,000,000. In Pearisburg, Va., **Hughes-Foulkrod Co.**, will build a $750,000 celanese plant. Tobacco plant building in Richmond, Va., went to **John Felmley**, of Bloomington, Ill., for $500,000.

Commercial — College building at New Haven, Conn., was bid in for $2,500,000, by **Vermilyea-Brown Co.**, of New York City. In New York City, **George A. Fuller Co.**, will construct a $1,000,000 office building for Aetna Casualty & Surety Co. A $900,000 Sears, Roebuck store in Houston, Tex., is being built by **Knutson Construction Co.**, local contractor. Hydro-electric development on Yadkin River near High Point, N. C., was awarded to **Maxon Construction Co.**, of Dayton, Ohio, for $1,674,423.

WATERWAYS

Contract amounting to $983,101 for rock jetties at Chicago, Ill., was awarded to **Fitzsimons & Connell Dredge & Dock Co.**, of Chicago. For dredging river channel at Detroit, Mich., **Dunbar & Sullivan**, of Detroit, received an $868,262 contract. Dredging in the vicinity of Providence, R. I., went to **Morris & Cummings Dredging Co.**, of New York City, for $342,608. Bulkhead wall and municipal wharf at Providence, R. I., was let to **R.—B. Corp.**, of Providence, for $1,195,973. A bid of $808,900 obtained a sewer and bulkhead contract in New York City for **De Balso Construction Co.**, local contractor.

BRIDGES

J. Rich Steers, Inc., of New York, obtained $2,268,000 contract for East River Drive viaduct in New York City. Multiple grade separation in Winnetka, Ill., went to **Minder Construction Co.**, of Chicago, for $1,015,371. Cross Island Parkway grade separations in Long Island, N. Y., were awarded to **National Excavation Corp.**, of New York, for $718,275. Steel superstructure for Carter bridge, in Cleveland, Ohio, was bid in for $559,600, by **Mt. Vernon Bridge Co.**, of Mt. Vernon, Ohio. Grade separation in Queens county, New York, costing $597,794, will be built by **Good Roads Engineering Co.**, of Wantagh, Long Island. For three underpasses in Dallas county, Texas, successful bidder was **R. R. Tway**, of Oklahoma City, with a price of $278,484. Two bridge contracts at Lorain, Ohio, went to **Great Lakes Dredge & Dock Co.**, of Cleveland, for $293,539 and $176,000 respectively.

WATERWORKS AND SEWERS

Lateral sewers and pumping stations at Trenton, N. J., will be built by **J. Miele Construction Co.**, of Maplewood, N. J., for $748,000. In Springfield, Mass., a $433,560 contract for intercepting sewer went to **Deliso Construction Co., Inc.**, of Jamaica, N. Y. Sewer construction is under way in Kenosha, Wis., at cost of $314,000, by **N. D. Mancini & Drainage Contractors, Inc.**, of Detroit, Mich. Sewage disposal plant for New Haven, Conn., will be built for $479,889, by **New Haven Road Construction Co., Inc.**, local contractor. Contract for sewage treatment plant in Kenosha, Wis., was awarded to **Kroening Engineering Corp.**, of Milwaukee, for $320,868.

Construction Methods and Equipment

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A McGRAW-HILL PUBLICATION

The "How" of it

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How CANAL SECTION was shaped by special machine. — p. 33
How CLOSE TOLERANCES governed form setting and concreting of barrel arch roof over ship-model testing basin. — p. 36
How STEEL FALSEWORK carried load of arch reinforcement and concrete placed on 2-in. thickness of fiber insulation. — p. 36
How REINFORCEMENT for long concrete arch was placed as a prefabricated mat. — p.37
How HYDRAULIC VIBRATORS, operated by oil under pressure, consolidated concrete. — p. 38
How PRECAST PANELS of exposed aggregate concrete only 2 in. thick were used as exterior facing of building. — p. 39
How HIGH-STRENGTH REINFORCEMENT of twisted dual rods reduced slab costs on mass housing project. — p. 42
How VACUUM MATS removed excess water from concrete floor slabs on housing project. — p. 43
How PROGRESSIVE CONSTRUCTION of three groups of apartment buildings was scheduled for concreting with nine sets of forms. — p. 44
How TRUCK MIXER delivered concrete to hopper at base of elevator tower. — p. 45
How PAINT SPRAY OPERATORS are protected by respirator masks. — p. 46
How SAFETY INSTRUCTION is given to employees of state highway department. — p. 46
How EYE ACCIDENTS, due to flying fragments, are prevented by wearing of goggles. — p. 47
How SNOW PLOW carried own headlights as safety measure. — p. 48
How SHEETPILE INTERLOCKS were made with aid of pair of special steel plates known as "iron monkey". — p. 50
How SLIDE PROTECTION on state highways was afforded by steel-pile structures. — p. 51
How MOBILE DRILLING OUTFIT was created by mounting compressor and drill on tractor. — p. 52
How "FISHING" for broken or detached drill bits was aided by use of mirror and sunlight. — p. 52
How BATCH TRUCKS holding four charges delivered bulk cement. — p. 53
How WEIGHT SAVING in 100-ft. crane boom was effected by use of high-strength alloy steel. — p. 52
How LONG VIADUCT was built to eliminate traffic bottleneck. — p. 54
How CLAMSHELL BUCKET on extended power shovel boom excavated caisson close to railroad track. — p. 55
How COLUMN FORM of plywood, backed by 1-in. lagging, was prefabricated with wales in place. — p. 59
How "GOLF TEE" COLUMNS of concrete, with hollow stems, required special forms and reinforcement. — p. 60
How BRICK WALL was insulated with cork slab dipped in asphalt. — p. 61

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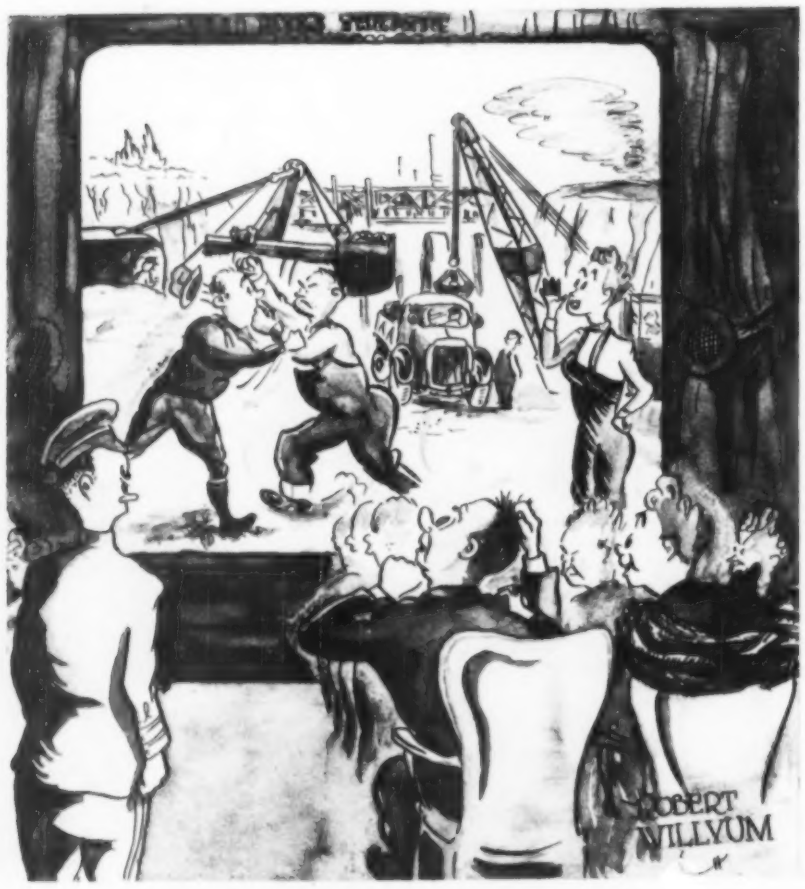
"Purty good fer not havin' no saw — ain't it?"

"Sit back and relax, dear. You're not bossing this job!"



"Let's charter a boat Sunday and go out for some deep-sea fishing!"

THIS SAYS: "BETTER CONCRETE"

"BETTER cement makes better concrete," as the saying goes — and here is a typical example: Completion of Missouri Pacific tunnel, Gray Summit, Mo., built in 1929, determined date when new double-track cut-off, St. Louis to Jefferson City, could be placed in service.

Using 'Incor' 24-Hour Cement, one set of forms sufficed; the single form section was moved forward 12 to 24 hours after placing concrete; lining followed closely on drilling operations.

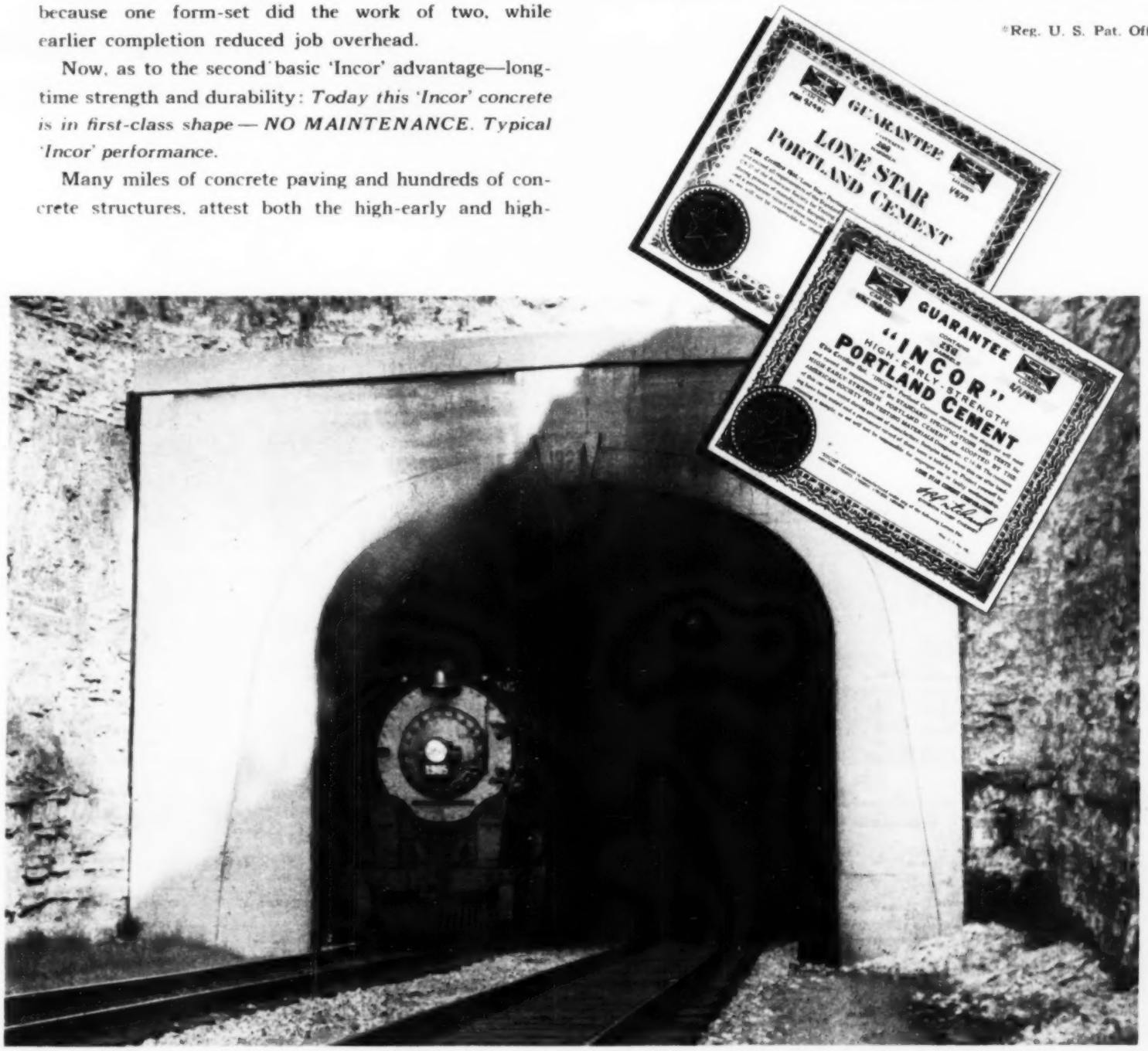
'Incor' saved weeks of delay. Saved money, too — because one form-set did the work of two, while earlier completion reduced job overhead.

Now, as to the second basic 'Incor' advantage—long-time strength and durability: *Today this 'Incor' concrete is in first-class shape — NO MAINTENANCE. Typical 'Incor' performance.*

Many miles of concrete paving and hundreds of concrete structures, attest both the high-early and high-ultimate quality of this improved Portland cement — prove that 'Incor' is producing the same kind of high-quality concrete that skilled contractors have been making with Lone Star Cement ever since 1900.

For behind 'Incor'* stands Lone Star's 39-year record for unvarying quality and uniformity. Use 'Incor' where high-early strength and faster job curing show you a profit — elsewhere use Lone Star. Quality-guarantee certificate with every shipment. Write for book . . . "Cutting Concrete Costs." Lone Star Cement Corporation, Room 2265 342 Madison Ave., New York.

*Reg. U. S. Pat. Off.



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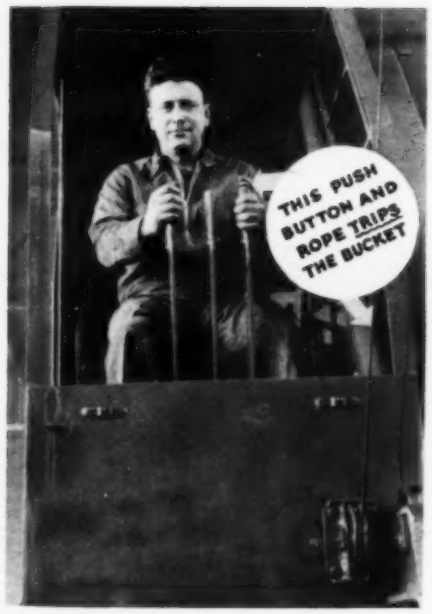
MAKERS OF LONE STAR CEMENT • • • 'INCOR' 24-HOUR CEMENT

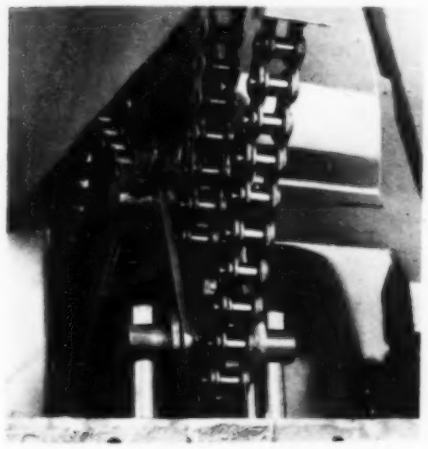
Sales Offices: ALBANY, BIRMINGHAM, BOSTON, CHICAGO, DALLAS, HOUSTON, INDIANAPOLIS, JACKSON, MISS.; KANSAS CITY, NEW ORLEANS, NEW YORK, NORFOLK, PHILADELPHIA, ST. LOUIS, WASHINGTON, D. C.

BIGGEST VALUE IN SMALL SHOVELS

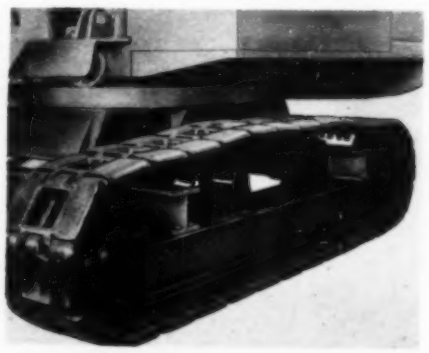
After operating other machines, "Mickie" Hoffman at controls, says the BAY CITY is the most powerful and easiest to handle.



Even to dipper trip, BAY CITY machines are designed for ease of operation. Photo above illustrates the simplicity of operating the exclusive Electric Dipper Trip which, according to users adds from 10 to 15% to daily yardage. Available at *no extra charge* on machines equipped with starter.



How much would you pay for this powerful sturdy one-piece chain crowd on your present equipment? It's standard on all BAY CITY Shovels providing many economies and wider working ranges. Automatic chain adjustment takes up slack and maintains tension at all boom angles.



Drop forged crawler shoes with specially hardened driving lugs, drilled pin holes and alloy pins will give you longer wear, saving you important money. Dual end adjustment on heavy crawler frame pays dividends too.

John Hoffman of Indianapolis is but one of the increasing number of contractors and excavators who are turning to BAY CITY for new economies in dirt handling. The big yardage, speed, power and low operating and maintenance cost of this new ¾-yard BAY CITY is giving him real pay dirt — and it's pay dirt that counts on any job. The simplicity of design, quality workmanship and outstanding performance of these rugged BAY CITY machines, fully convertible without machinery change, are establishing new records. It will pay you to investigate before buying your next machine. Note the illustrations at the right where we show three of the many outstanding features which are completely described in our Catalog H-2. Write for it, no obligation.

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Bay City, Michigan

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BAY CITY SHOVELS

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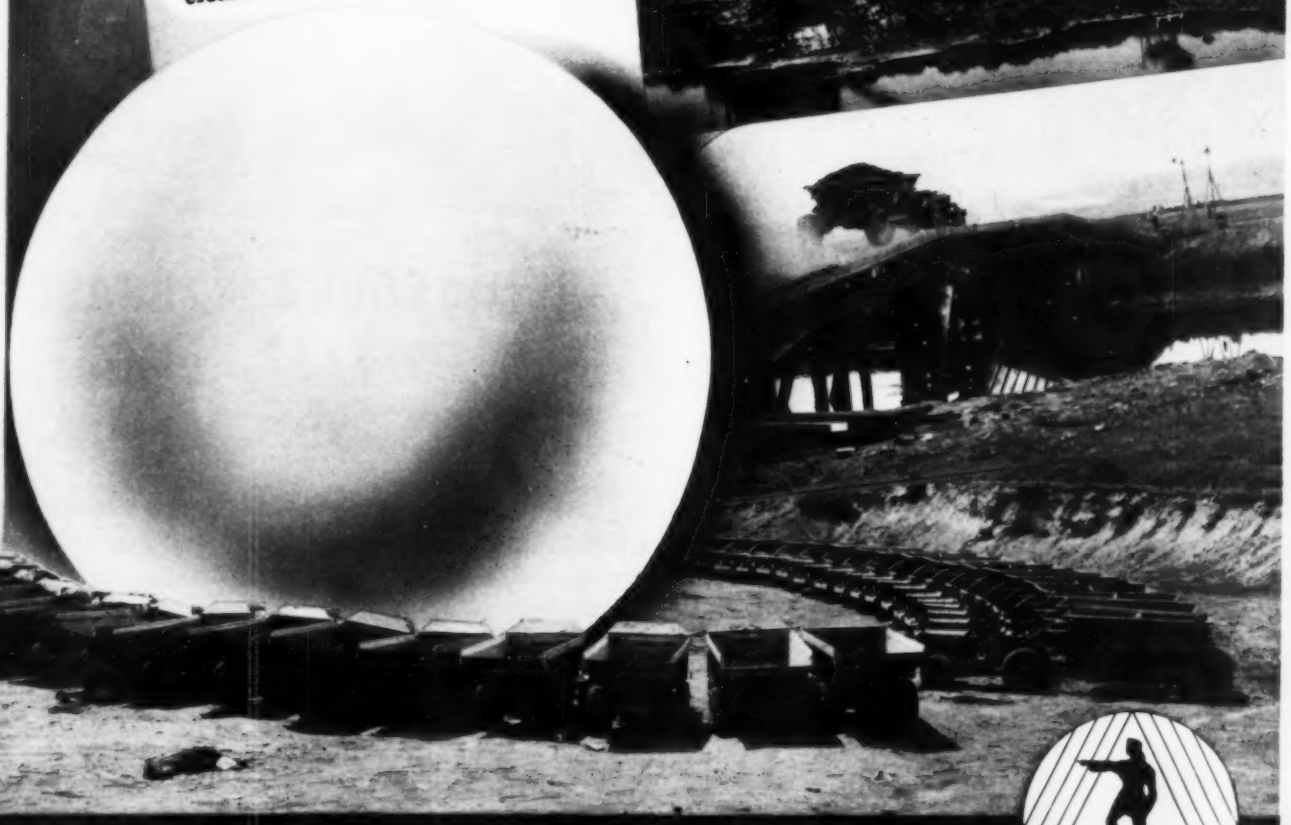
"The World of Tomorrow"

A FLEET of 36 Trac-Truks, operated by the Johnson-Necaro Company, were the first earth-moving units to move in on the New York World's Fair site. Time was short . . . the job called for handling millions of yards of debris and "meadow mat" . . . in a single period of 151 days, 20 Bottom Dump Trac-Truks moved 3,200,000 yards of hard-to-handle material. Another fleet of 16 Rear Dump Trac-Truks showed a similar record of performance. The photos are views of the Johnson-Necaro Company's Trac-Truk fleet on the job. The entire fleet is pictured around the perisphere below. It is this ability to tackle and complete big jobs like the New York World's Fair project in record time that makes Trac-Truks the "Big Value Investment" in the earth-moving field. Wherever there is big construction under way you will find Trac-Truks on the job because **they increase the profit margin.**



THE EUCLID ROAD MACHINERY CO.

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EUCLID
THE PIONEER

Another HEIL DIG-N-CARRY "Profit" Feature!

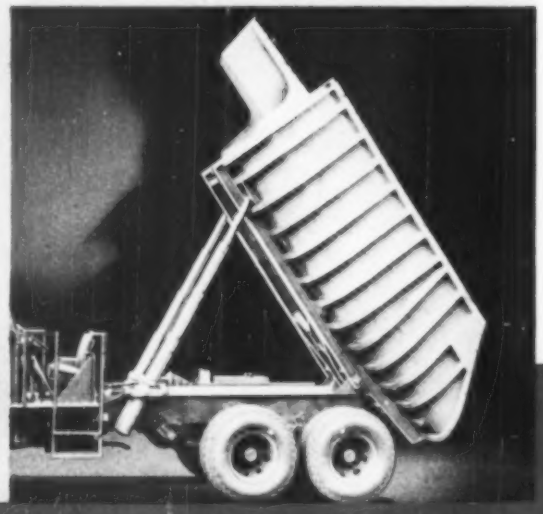
Above: Heil hydraulic control eliminates "washboard" digging. The operator maintains a smooth, accurate cut by watching the indicator gauge on the scraper. Also note finished back-sloping operation that eliminates need of grader blade.

SPLIT-SECOND HYDRAULIC CONTROL INSURES FAST, SMOOTH, ACCURATE CUTTING AND SPREADING

One of the outstanding features of Heil Dig-N-Carry Scraper design is the GUARANTEED HYDRAULIC SYSTEM that insures split-second control of every operation . . . Three, handy levers mounted on the tractor and an indicator gauge mounted on the scraper provide for fast, smooth, accurate cutting and spreading . . . EFFICIENT, HEIL HYDRAULIC CONTROL is only ONE of MANY PROFIT ADVANTAGES of HEIL DIG-N-CARRY DESIGN that progressive dirt moving contractors everywhere are cashing in on! . . . Your nearest Heil distributor will welcome an opportunity to explain all the remarkable operating features of Heil Dig-N-Carry Scrapers. Write, wire or phone your inquiry to:

FAMOUS HEIL HYDRAULIC DUMP UNITS

Heil Dig-N-Carry scrapers are built and backed by the same organization that produces world-famous Heil hydraulic dump units! Ask for your free copy of the latest Heil Equipment Catalog.



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Please send me my copy of "How to Pave Your Way to Profits in 1939."

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By *Title*

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City *State*

REX PAVERS
CHAIN BELT COMPANY of MILWAUKEE

GAHAGAN CHANGES SHORE LINE

8,000 CU. YDS. A DAY

Two of the Gahagan Construction Corporation, drag-lines at work. All these powerful machines, from the power end to gears and wire rope are Texaco lubricated.

HEAVY GOING on the Shore Parkway construction. No breakdown can be permitted. Texaco Lubricants help keep machines in peak condition.

CHANGING THE SHORE LINE of New York's Jamaica Bay in a $28,000,000 improvement project, the Gahagan Construction Corporation, is dredging, filling, grading, and building the Shore Parkway. Six drag-line units supplemented by two heavy tractors handle the moving of 8,000 cu. yds. of heavy muck every working day. Gahagan Dredge No. 5 is at work in the Bay.

Two other dredges are working in Utica, N. Y. and in Peru, S. A.

Keeping on schedule means keeping equipment always on the job. The engineers are specific when it comes to lubrication. With Gahagan on the Shore Parkway, it's Texaco throughout, 100%, from fuels to lubricating oils and greases.

For better results from your lubrication, get in touch with the nearest of our 2229 warehouses in the U. S., or write to:

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GASOLINE ENGINE on one of the Gahagan drag-lines gets a crankcaseful of Texaco Motor Oil, Insulated. No other oil ever goes into these units.

Texaco Dealers invite you to tune in The Texaco Star Theatre—a full hour of all-star entertainment—Every Wednesday Night—Columbia Network—9:00 E.S.T., 8:00 C.S.T., 7:00 M.S.T., 6:00 P.S.T.

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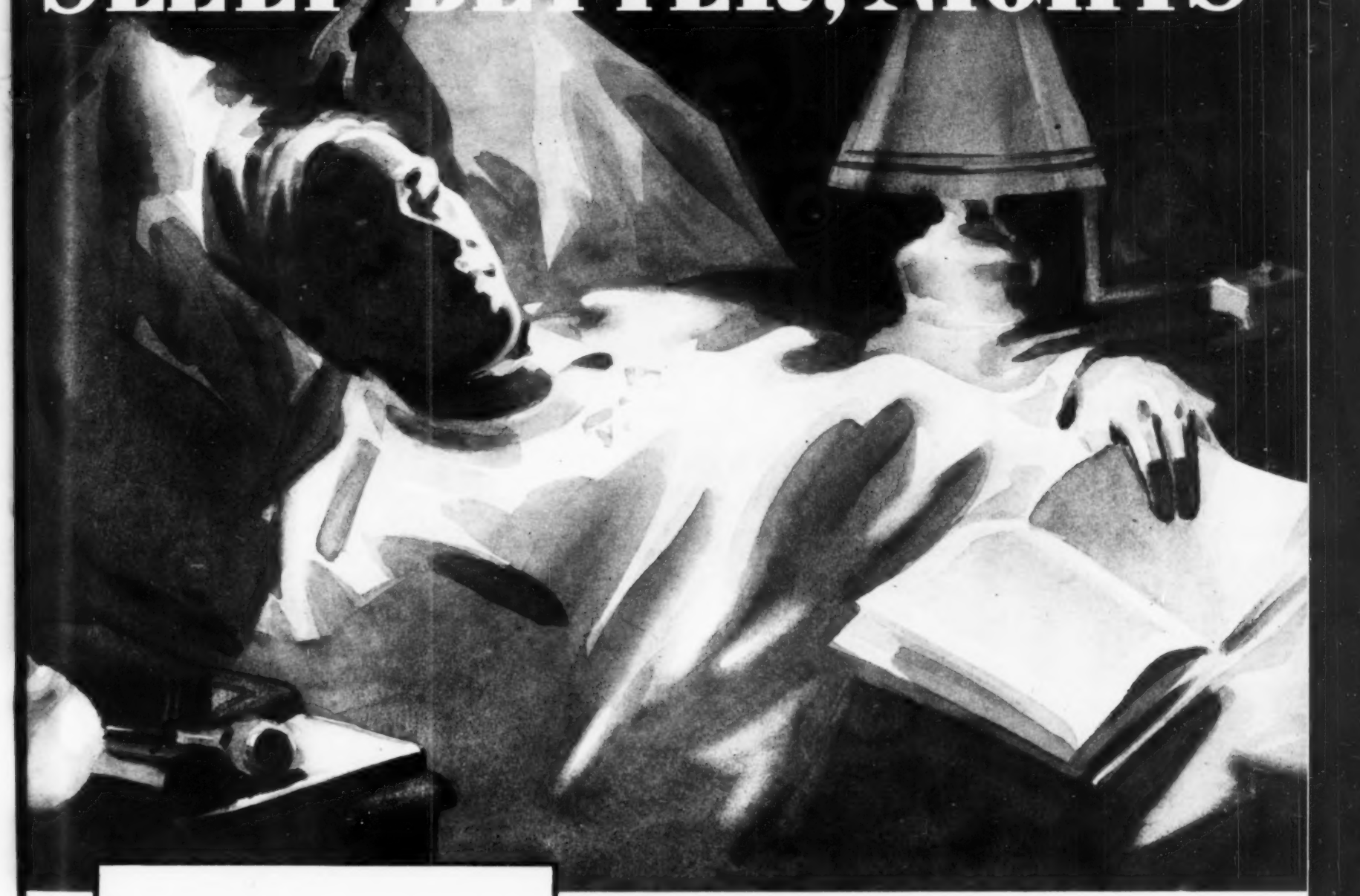
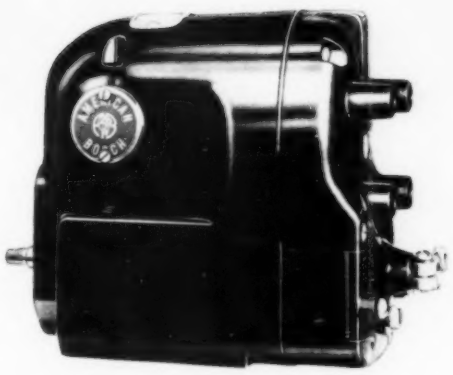
PERFECTED LUBRICATION FOR AUTOMOTIVE EQUIPMENT

HELPS AMERICA'S "50 FOREMOST"
SLEEP BETTER, NIGHTS





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"They" are more than 50 of America's foremost manufacturers, who equip the machinery they build with American Bosch Super Powered Magnetos. American Bosch combines the oldest tradition in magneto engineering with the latest and greatest advances in magneto history!

AMERICAN BOSCH CORPORATION, Springfield, Mass.

AMERICAN BOSCH
Super Powered MAGNETO

The Backbone of Skyscraper St

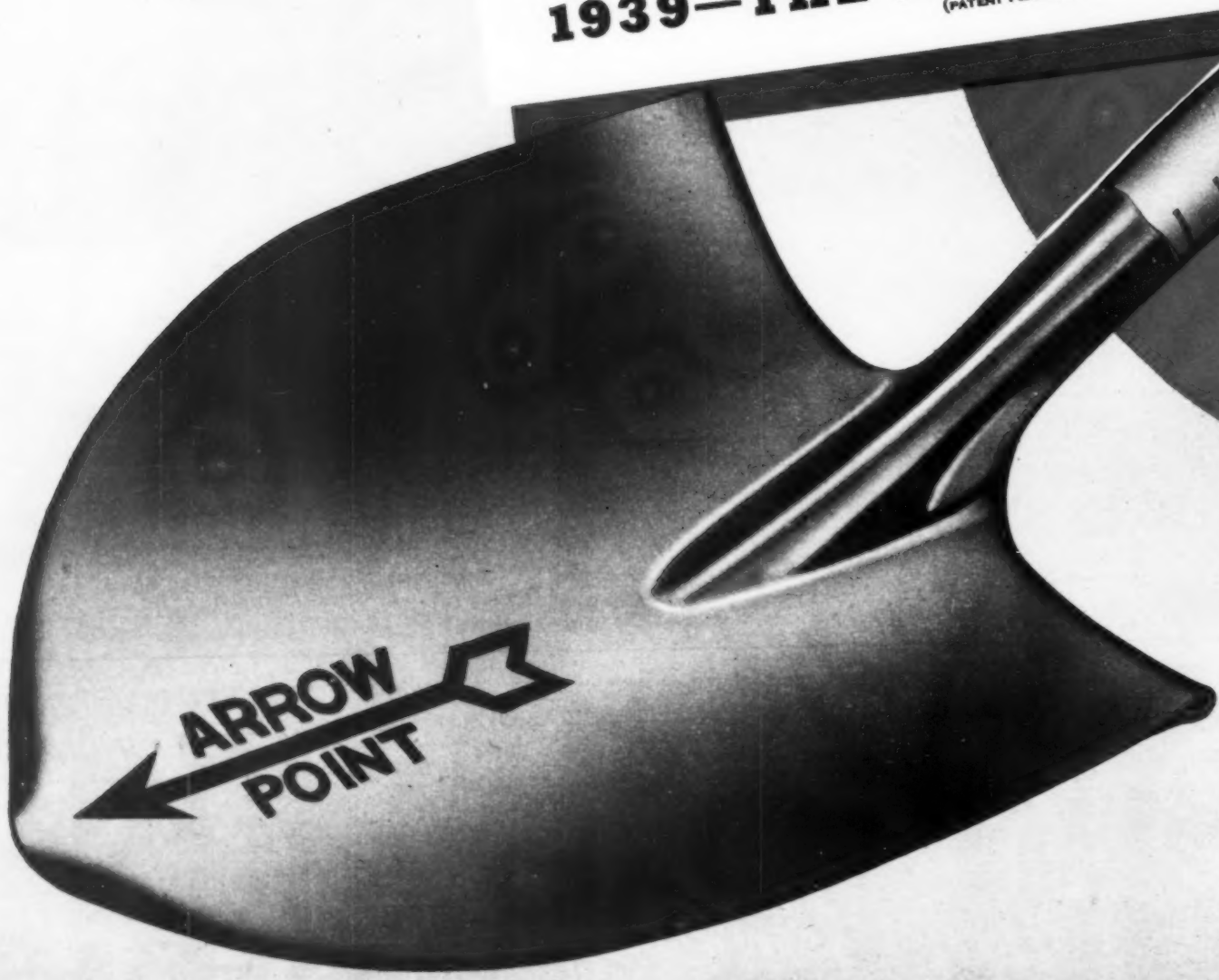
FOR 1939

IT'S THE WOOD'S LEADS AGAIN!

TAKE A LOOK AT THE RECORD

ALL Recognized Shovel Features—
ALL Introduced by WOOD'S

1913—Heat-Treated Shovels and Scoops
1920—Molybdenum Steel Shovels and Scoops
1921—Moly "Split-D" Handles
1922—Turned Steps on Plain Backs
1931—Aluminum Shovels and Scoops
1932—Rolled Shoulders on Hollow Backs
1933—"Arrow Point" on Round-Point Shovels
1934—"Closed-Back" Shovels
1938—Printing on Blades
1939—THE I-BEAM (PATENT PENDING)



Strength Applied to Shovel Construction!

BEAM

STEELED AGAINST STRAIN
WHERE THE STRAIN IS GREATEST

In 65% of the breaks in shovel handles the fracture occurs at the upper rivet or the end of the socket. It is here that the wood must withstand the greatest strain from prying and the greatest shock from striking hard materials when shoveling. You can see where this strain comes, by placing the point of the shovel under some heavy object and raising it by bearing down on the handle—the common method of raising railroad ties, rocks, etc.

To absorb this strain without increasing the weight of the shovel beyond high efficiency, Wood's turned to the famous I-Beam construction—the backbone of skyscrapers!

The members are held tight and firm under all weather conditions by the socket and rivets—the flange is cut to form an I-Beam above the socket—giving you a shovel that is at least 30% stronger in the section where handle breakage most frequently occurs. You can tell at a glance that this new I-Beam feature sets Wood's "Closed-Back" shovels in a class by themselves. They *look* sturdier—they *are* sturdier; and they are ready to prove it in everyday service.

The I-Beam is a new feature of all Wood's "Closed-Back" shovels, with the exception of Grade "C" Piqua Brand shovels. They are now available through regular distributing channels. The Wood Shovel and Tool Company, Piqua, Ohio.

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WE SAID IT 5 YEARS AGO

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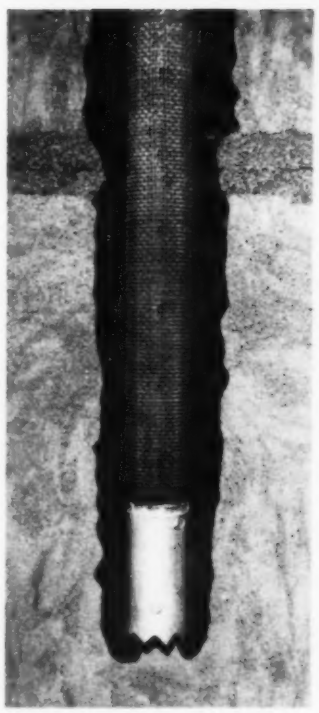
HARNISCHFEGER
CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

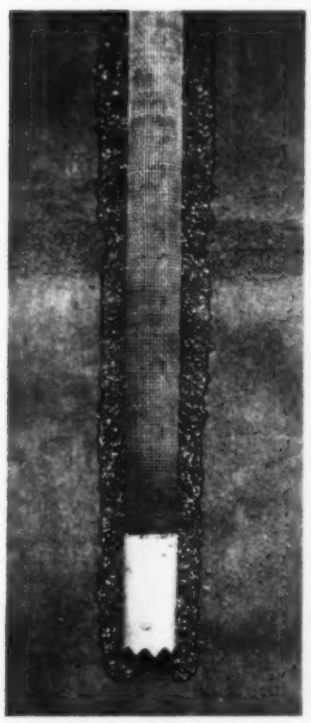
1925 Fourteen Years of Unqualified Success for the Moretrench Wellpoint System 1939

● All Moretrench Wellpoints have two valves in the Jetting Tip. One opens to let the jetting water out. The other closes to prevent backwaste of the jetting water through the screen passageway, **thus compelling the concentration of all of the jetting pressure at the tip as shown above.**



During installation the scouring out of the earth in all directions by direct contact with the jetting stream at the tip *leaves a comparatively wide hole around the wellpoint.*

On its way out the rapidly moving water separates the clogging mud and fines from the good sand, depositing the latter on the surface where it can be immediately shoveled back into the hole when the jetting pressure is turned off *in order to provide a pervious lining around the wellpoint.*



A wellpoint that works in a sand lined hole *remains free from contact with the clogging elements of the original soil,* and water passes easily from the ground to and through the sand and into the wellpoint when pumping begins.

All Moretrench Wellpoints have this water-saving, hole-providing, second valve.

Its effective use is one of the chief reasons for the success of the Moretrench Wellpoint System in providing maximum predrainage at minimum cost.

We have the points, the pumps, and the know-how to dry up any job from a small trench to a ten-acre cofferdam. Plant to rent in any quantity on short notice and on reasonable terms.

MORETRENCH CORPORATION

***Sales and Rental Office:* 90 West Street, New York**

***Plant:* Rockaway, New Jersey** · ***Western Warehouse:* Joliet, Illinois** · ***Cable Address:* Wellpoints, New York**

Corrosion in Wire Rope is like old-fashioned "Rhumatiz"

The bearings just don't work. Hence flexibility is lost and the extra bending load from this stiffness quickly destroys the individual wires. A corroded rope is a dangerous rope to use. If the wires of a rusty rope are still in good condition, the rope may be salvaged. A thorough treatment with a penetrating lubricant will free the bearing surfaces and permit the wires to slide by each other when the rope is flexed. But no amount of oil can replace worn surfaces. The best thing is . . . don't let your rope get "Rhumatiz". Wire Rope is made with proper oil impregnation of the hemp centers and ample slushing of the wires inside and out to assure proper lubrication during storage, marketing and initial use. Protect it by greasing the surface during use and enjoy the longest possible service from Wire Rope.

WICKWIRE ROPE

WICKWIRE SPENCER STEEL COMPANY

General Offices: 41 East 42nd Street, New York City; Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Portland, Seattle. Export Sales Department: New York City

UP TO 16 CU. FT. WINDROWS - AT 160-180 TONS AN HOUR

JAEGER Offers the Way for Low Cost, Better Mixed Stabilized Base and Heavy Mats!

Gathering Screws in Front, Belt Attachment at Rear — NO BUCKETS TO CLOG AND STOP WHEN MATERIAL IS STICKY WET.

From Minnesota to Mexico, Outstanding Records Prove This Traveling Pugmill a Major Advance in Road Building...

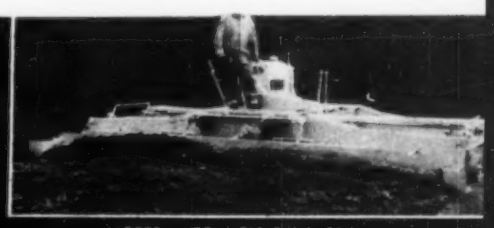
By the end of 1938, with hundreds of miles of road completed in numerous states, ranging from half width retreads of 1" thickness up to 36 ft. sand-clay-gravel stabilization in 3" compacted courses, Jaeger proved to the road-building field the high production, thoro mixing and sensational economies of the one-pass pugmill Road Builder.

Ability to thoroly mix up to 16 cu. ft. windrows of stabilization materials (160-180 tons an hour) with one machine and one operator and with subgrade absolutely clean for inspection or application of tack coat — to measure and apply water for compaction or bitumen for binder — to both mix and smoothly finish bituminous wearing courses in one operation by use of Spreader-Finisher attachment — to produce daily by means of an inexpensive tractor-drawn model, over 3 miles of light 10 ft. retreads, ready for rolling — these are job facts of tremendous importance to contractors figuring 1939 work. Let us give you the story in detail. THE JAEGER MACHINE CO., 800 Dublin Ave., Columbus, Ohio.

PUMPS ACCURATELY MEASURE AND APPLY WATER OR BINDER. Reserve Tanks Keep Machine Working Until Next Supply Truck Arrives.

JAEGER BITUMINOUS PAVER
Precision Smooth Pavements at Low Cost

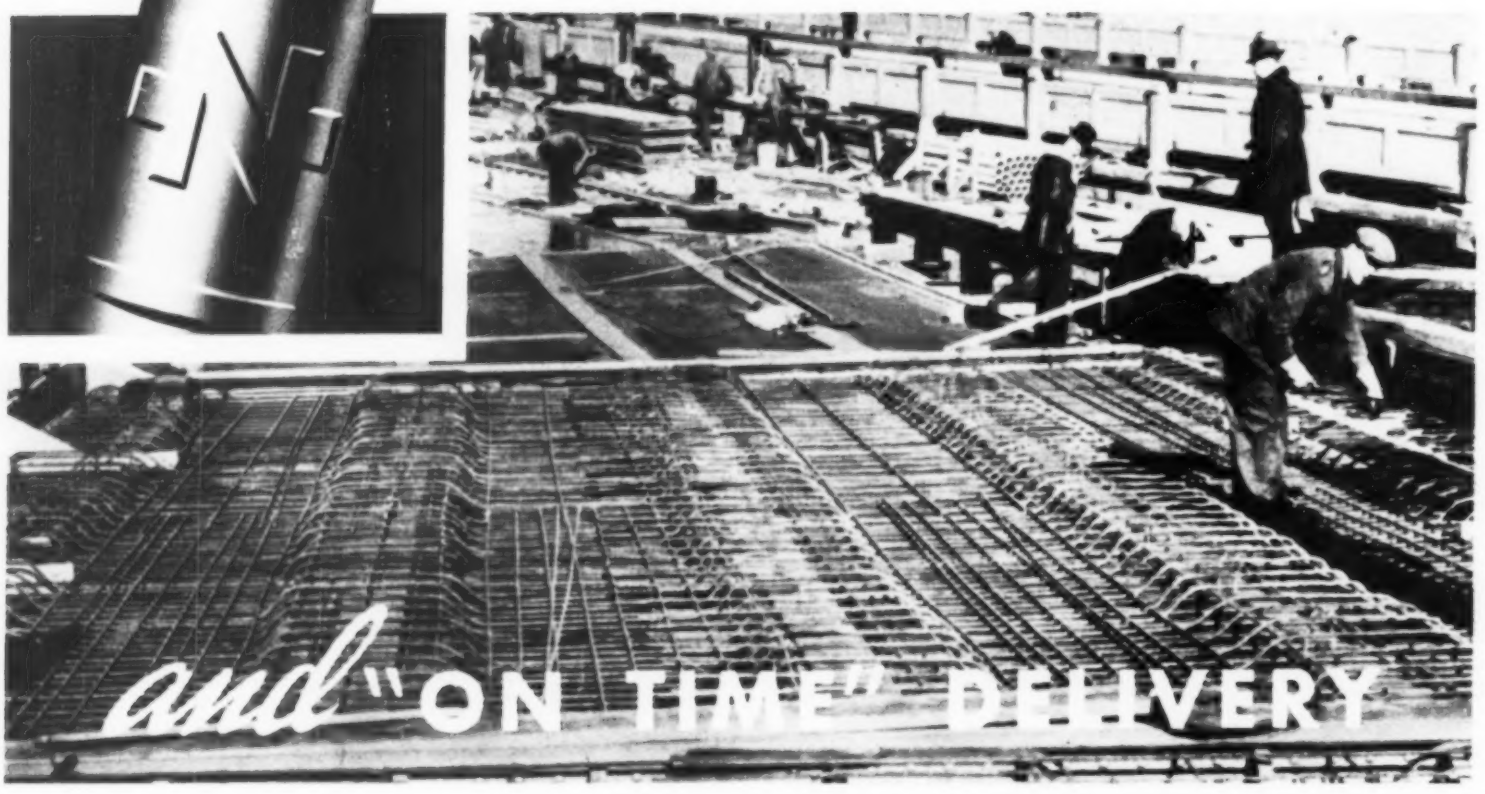
JAEGER Mix-in-Place ROAD BUILDER



JAEGER AUTOMATIC FINISHER
for Highest Type Concrete or Bituminous

Two things to ask for on Concrete Bars:

..THIS MARK



Here's how to get Both!

WHEN the Quality Symbol of the Concrete Reinforcing Steel Institute is on the concrete reinforcing bars delivered to your job, you know the quality of the bars you are getting. For this symbol assures you that they are rolled to standard specifications, and only from *new* billet steel. It tells you that they are a product of domestic manufacture. Insist on concrete reinforcing bars that carry this mark so that you can be *sure* of the quality and characteristics of the bars you buy. All U·S·S Concrete Reinforcing Bars carry this Quality Symbol.

And there's another advantage in ordering U·S·S Concrete Reinforcing Bars. Our distributors are so located that you are assured of prompt service no matter when or where you want the bars delivered. Our distributors carry ample stocks of all standard sizes. Should you require bending or cutting of bars before delivery this can be readily done to your specifications.

Get quality and promptness in delivery on your next order of concrete reinforcing bars. Specify U·S·S.

USS

"Look for this symbol on steel products. It represents the highest quality, the finest metallurgical service."

CONCRETE REINFORCING BARS

Manufactured by

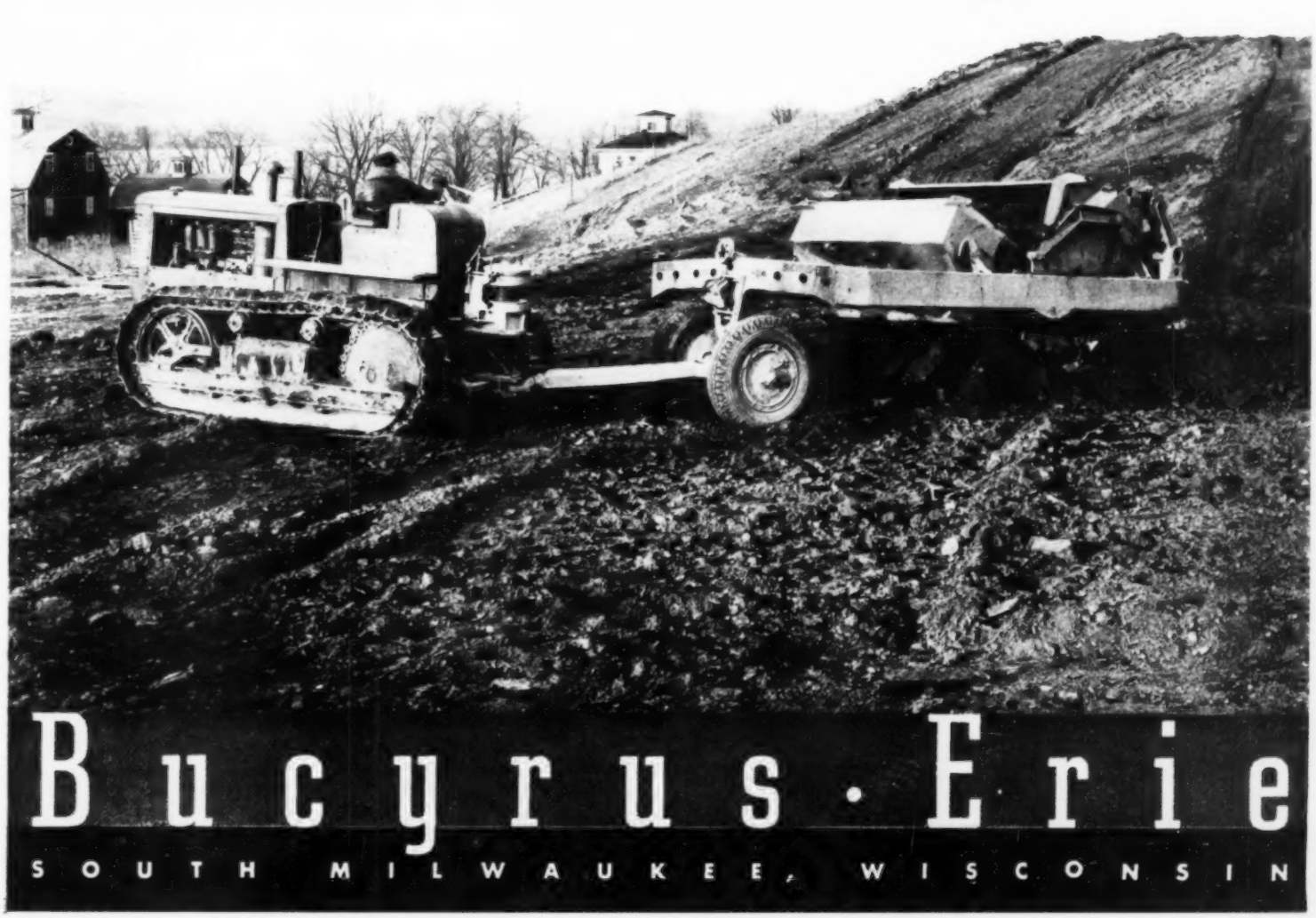
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*

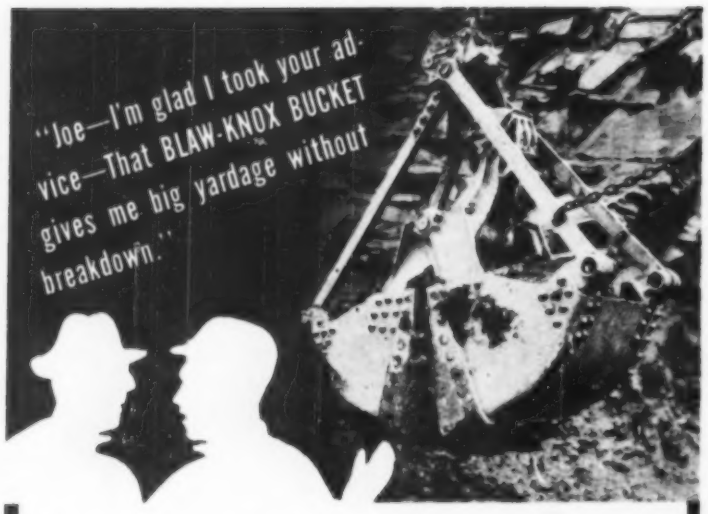
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*

Columbia Steel Co., San Francisco, *Pacific Coast Distributors* · United States Steel Products Co., New York, *Export Distributor*

UNITED STATES STEEL

INTERNATIONAL
TD 18 TracTracTor
+
BUCYRUS · ERIE
M 81 4-Wheel Scraper
=
A perfect team to give you lowest cost dirt moving!



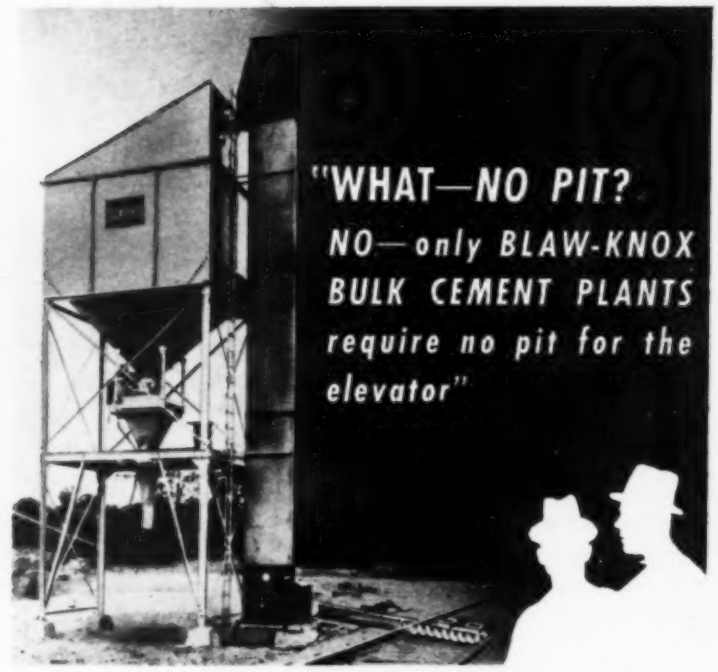


● Contractors know that the proper use of modern steels and alloys at critical points is their assurance of long uninterrupted service when they buy a Blaw-Knox Bucket.

If you aim to increase yardage and efficiency, to reduce maintenance costs and prolong the life of your buckets—investigate Blaw-Knox Buckets for all kinds of digging and rehandling Send for Blaw-Knox Bulletin No. 1561.

BLAW-KNOX DIVISION of Blaw-Knox Company
FARMER'S BANK BUILDING PITTSBURGH, PENNA.
Offices and Representatives in Principal Cities

BLAW-KNOX
Clamshell BUCKETS

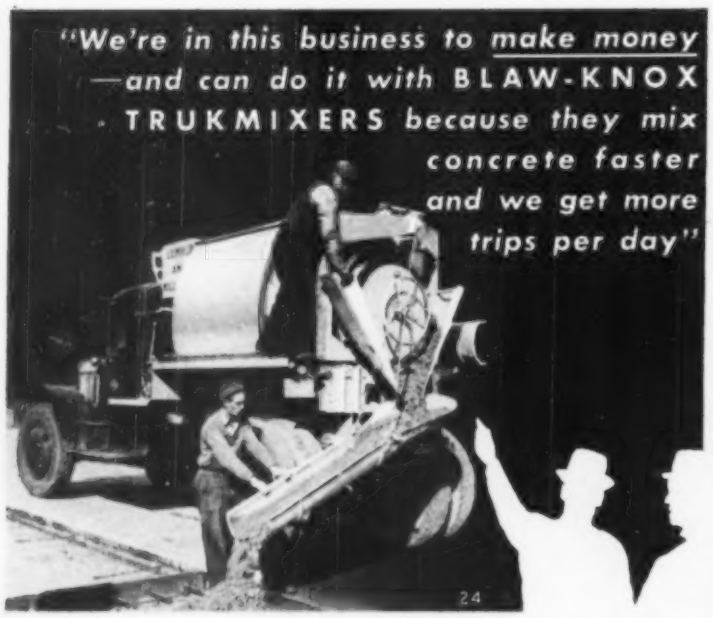


Blaw-Knox BULK CEMENT PLANTS are the ultimate in portability, speed, and convenience of use and operation. They are *complete units* for unloading, storage, batching and handling of bulk cement—dependable and accurate.

Completely described in Blaw-Knox Catalog No. 1566. Send for copy.

21

BLAW-KNOX BLAW-KNOX DIVISION
Bulk Cement Plants


"We're in this business to make money —and can do it with BLAW-KNOX TRUKMIXERS because they mix concrete faster and we get more trips per day"
24

It's a comfortable feeling to have truck mixers working for you that perform 100% under all conditions. No breakdowns—no worries.

You make a *profitable investment* when you buy Blaw-Knox Trukmixers and agitators. Write for Catalog No. 1582.

BLAW-KNOX
Agitators and TRUKMIXERS

For compacting earth fills—the practical design of Blaw-Knox Sheepsfoot TAMPING ROLLERS appeals to contractors because they give uninterrupted service and meet all modern specification requirements.

The roller units are full floating, on husky frames—built for long hard use.

Send for complete details and prices.

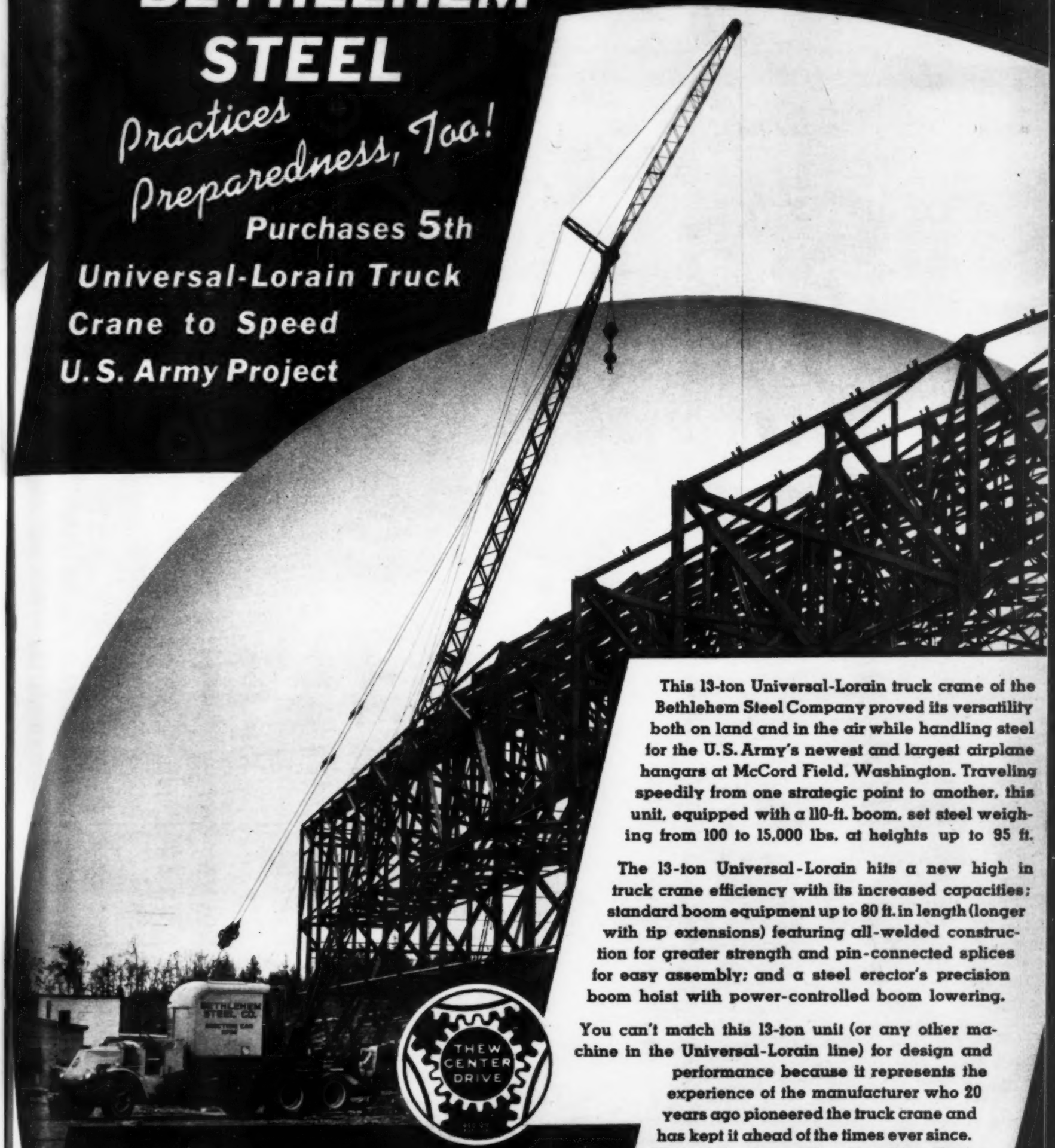
BLAW-KNOX DIVISION of Blaw-Knox Co.
FARMERS BANK BLDG. PITTSBURGH, PA. 19

BLAW-KNOX
TAMPING ROLLERS

BETHLEHEM STEEL

Practices Preparedness, Too!

Purchases 5th Universal-Lorain Truck Crane to Speed U.S. Army Project



This 13-ton Universal-Lorain truck crane of the Bethlehem Steel Company proved its versatility both on land and in the air while handling steel for the U.S. Army's newest and largest airplane hangars at McCord Field, Washington. Traveling speedily from one strategic point to another, this unit, equipped with a 110-ft. boom, set steel weighing from 100 to 15,000 lbs. at heights up to 95 ft.

The 13-ton Universal-Lorain hits a new high in truck crane efficiency with its increased capacities; standard boom equipment up to 80 ft. in length (longer with tip extensions) featuring all-welded construction for greater strength and pin-connected splices for easy assembly; and a steel erector's precision boom hoist with power-controlled boom lowering.

You can't match this 13-ton unit (or any other machine in the Universal-Lorain line) for design and performance because it represents the experience of the manufacturer who 20 years ago pioneered the truck crane and has kept it ahead of the times ever since. Write today for catalog describing Universal-Lorain truck cranes and shovels.

UNIVERSAL LORAIN

Truck Cranes, 6 1/2 to 13-ton capacity
Truck Shovels, 3/8 to 3/4-yd. capacity

UNIVERSAL CRANE DIVISION
THE THEW SHOVEL COMPANY
LORAIN, OHIO

"WORKIN' ON

The start of the White River Backwater Levee, in Arkansas. R. E. Miller, of Arkansas City, owns this bulldozer-equipped "Caterpillar" Diesel D7 Tractor that's piling logs and brush for burning. Real power and stamina needed here. But this "Caterpillar" Diesel's got both — and it's got real fuel-economy too! Working 9 hours a day, on only 2½ gallons of fuel an hour, the tractor cleared 18 acres a day!

More clearing-work at White River. C. I. Jones, of New Orleans, owns these two bulldozer-equipped "Caterpillar" Diesel Tractors. Running double to move tree stumps is a practical, time-saving procedure. For it lessens the tendency of the large root masses to slip off the ends of the 'dozer. Save time this way — and save money, with "Caterpillar" Diesel fuel-economy!

CATERPILLAR DIESEL POWER

DIESEL ENGINES • TRACK-TYPE TRACTORS • ROAD MACHINERY

THE LEVEE!"

TAKE a quick look around at the building of the White River Backwater Levee, in Arkansas . . . and see how "Caterpillar" Diesel Power handles a job *from start to finish!*

Here's work that was *tough* from the word "Go"—with man-sized logs and brush to bunch for burning, and deep-rooted stumps to tear out. But a bulldozer-equipped "Caterpillar" Diesel got in there with all its power and mopped up 2 acres an hour, 9 hours a day . . . and did it on as little as 2½ gallons of low-cost fuel an hour!

When it came to running base, this same power and economy teamed-up with one of the new 18-yard Athey wagons and stayed on the job 24 hours a day. Making 7 trips an hour, over a 1200-foot, one-way haul, the "Caterpillar" Diesel and Athey managed payloads of from 14 to 15 yards a trip. You can't move loads that big, and make that many trips an hour, unless you've got traction that's actually *geared to the ground!*

With such demonstrations of power, efficiency and economy, it's no wonder "Caterpillar" Diesels were kept on at White River, right up to finishing the sides after the tower machine. Pictured, here, is a "Caterpillar" Diesel D4 handling the job with a bulldozer . . . using about 1 gallon of fuel an hour, 10 hours a day!

No matter where "Caterpillar" Diesels work — on the levee, or anywhere else — they prove themselves *big-capacity* machines. And along with their capacity go fuel-economy and savings on maintenance-repairs that *lay aside bigger profits!* See your "Caterpillar" dealer about the equipment you need.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

The job's done—or almost done! Here is the last step. A "Caterpillar" Diesel D4 Tractor, with a bulldozer, smooths the levee sides after a tower machine tops off. Working 10 hours a day, this "Caterpillar" Diesel used about 1 gallon of fuel an hour. You couldn't ask for any better fuel-economy than that!

If ever an outfit showed what an important part traction plays in moving payloads, this one did! It's a "Caterpillar" Diesel D8 Tractor and one of the new 18-yard Athey track-type wagons. Running base at White River, they made 7 trips an hour on a 1200-foot, one-way haul. Averaged loads of 14 to 15 yards. Worked 24 hours a day, with time-out only for lubrication and normal care. A bulldozer-equipped "Caterpillar" Diesel D7 Tractor spread the dumped material.

New "RPM" DELO

[Diesel Engine Lubricating Oil]

IS THE UNEQUALED LUBRICANT FOR ALL DIESEL ENGINES

First time in history one brand of Diesel lubricating oil equally successful in every type and size of Diesel equipment.

A VITAL CONTRIBUTION TO THE PROGRESS OF THE ENTIRE DIESEL INDUSTRY

STANDARD OIL COMPANY

10 MILLION test miles before our engineers would say, "Right!" Ninety thousand test hours before our engineers would say, "Unequaled!"

That's the research—laboratory and field—behind our announcement of NEW "RPM" Diesel Engine Lubricating Oil. Absolutely nothing taken for granted! Every point proved, and re-proved!

And NOW—New "RPM" DELO (in proper S. A. E. grades) brings new service benefits to ALL Diesel engines, regardless of type, size or service.

Now *every* Diesel—regardless of horsepower or design—can give clean-engine operation—free rings, clean pistons, unscratched liners, uncorroded bearings, sludge-free peak power performance plus a new low in cylinder and ring wear.

Yes, *any* Diesel engine, large or small! Yes, under *any* service conditions! Yes, in Death Valley or Siberia. Wherever you are—whatever Diesel equipment you operate or intend to buy—new "RPM" DELO will lubricate it! This outstanding oil gives perfected lubrication for the break-in—fewer overhauls from hard service—less repair stoppage. New "RPM" DELO—for maximum lubrication benefits! In *any* Diesel engine! In *every* Diesel engine!

Ask our representative or your nearest Distributor to see our Engineers' Report on New "RPM" DELO—complete test data that prove its unequaled performance conclusively. Then, take advantage of the money-saving benefits of this history-making Diesel lubricating oil.

ORDER FROM YOUR NEAREST DISTRIBUTOR AS LISTED BELOW:

IN THE UNITED STATES

"RPM" Diesel Engine Lubricating Oil:
THE CALIFORNIA COMPANY (Montana only)
HUMBLE OIL & REFINING COMPANY
STANDARD OIL COMPANY (Indiana)
STANDARD OIL COMPANY (Nebraska)
STANDARD OIL COMPANY OF CALIFORNIA
STANDARD OIL COMPANY OF TEXAS
UTAH OIL REFINING COMPANY

Diol "RPM" Diesel Engine Lubricating Oil:
THE CARTER OIL COMPANY Tulsa, Oklahoma
COLONIAL BEACON OIL COMPANY, INC.
STANDARD OIL COMPANY OF LOUISIANA
STANDARD OIL COMPANY OF NEW JERSEY
STANDARD OIL COMPANY OF PENNSYLVANIA

Kyso "RPM" Diesel Engine Lubricating Oil:
STANDARD OIL COMPANY (Inc. in Kentucky)

Signal "RPM" Diesel Engine Lubricating Oil:
SIGNAL OIL COMPANY

Sohio "RPM" Diesel Engine Lubricating Oil:
THE STANDARD OIL COMPANY (Ohio)

IN CANADA

"RPM" Diesel Engine Lubricating Oil:
IMPERIAL OIL COMPANY LIMITED
STANDARD OIL COMPANY OF BRITISH COLUMBIA LIMITED

THROUGHOUT THE WORLD

"RPM" Diesel Engine Lubricating Oil is also available through distributors in more than 100 other countries.
Get in touch with your nearest distributor—for a clean engine, and long hard service with the minimum of overhaul.

RPM
REG. TRADE MARK
DIESEL ENGINE LUBRICATING OIL

New "RPM" Diesel Engine Lubricating Oil now available everywhere in the gray barrel with the blue head.

OF CALIFORNIA

LaPlant-Choate BRUSHCUTTER

Here's a cost-cutting auxiliary tool that has repeatedly demonstrated its ability to clear a 11-foot path through trees and underbrush at the rate of 2 miles per hour. The escalloped hardened steel cutting edges of the sturdy V-blade shear off trees and underbrush at ground level. Positive hydraulic control enables operator to raise or lower blade easily and quickly to any desired position and assures rigid locking of the blade in position for safe, accurate, efficient work.

Your Right-of-Way to Extra Profits

LAPLANT-CHOATE

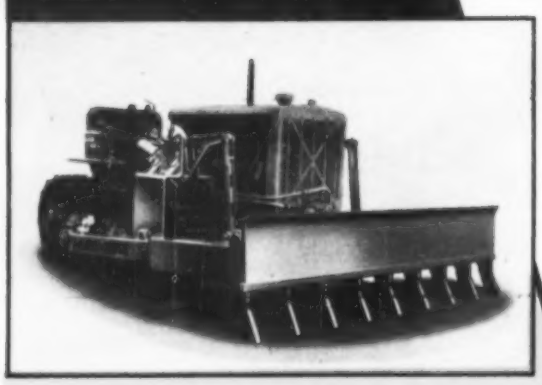
Hydraulically Controlled

Land Clearing Equipment

Economical · · · · Accurate
Fast · · · · Interchangeable

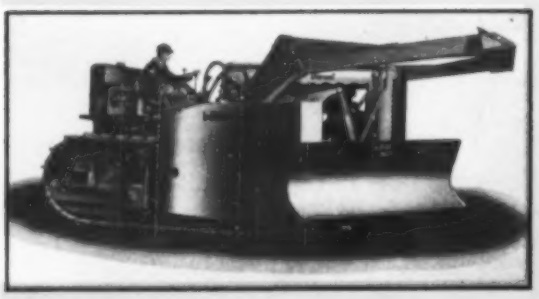
NOW you can stop worrying about lost time and extra manpower on clearing land in preparation for actual construction work on roads, dams, etc. LaPlant-Choate Brushcutter, Tree-Dozer, Root-Cutter and Rake Blade save you the expense of slow, laborious methods of cutting out trees, underbrush, etc., help you keep the job "on schedule"... and enable you to get additional profit-producing work out of your "Caterpillar" Track-type Tractors.

Slash your costs... increase your productivity this easy way. Because these units are readily interchangeable with LaPlant-Choate Trailbuilders, Bulldozers etc., you can utilize the tractor power you already have. Get full details from your LaPlant-Choate and "Caterpillar" dealer. Write for Free Catalog.



LaPlant-Choate RAKE TYPE BLADE

Provides a quick, money-saving way to pile brush and trees for burning. Designed to permit dirt to sift out before piling to assure easy burning. Ideal for root picking, scarifying and rock picking jobs because effortless hydraulic control assures positive down pressure and rigid locking of blade in any position. The large heavy teeth are removable and the points are hard faced to resist wear.



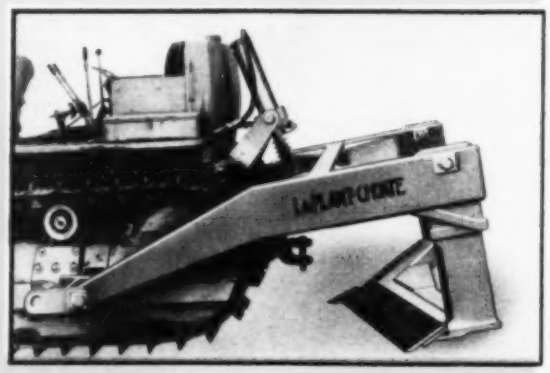
LaPlant-Choate TREE-DOZER

Trees as large as 18" in diameter are taken out by the roots, deposited in a windrow and the stump hole filled... all in one operation... with this time-saving, cost-cutting unit. The hydraulically controlled pusher bar is easily raised or lowered to correct height and rigidly locked in position to prevent slipping or bobbing when pushing. Wades right through any type of wooded land and underbrush.

LaPlant-Choate ROOT-CUTTER

Now you can cut off roots deep enough to prevent re-seeding without materially disturbing the top soil. Hydraulically controlled cutter blade is offset so that the tractor can stay on solid ground on successive rounds. Hinges on track frame of tractor. Can be used as separate tool while front-mounted LaPlant-Choate Tree-Dozer, Brushcutter, Trailbuilder or Bulldozer remain on the tractor.

Combined hydraulic down pressure and suction of the knife-edge force the blade into the ground. Hydraulic control locks the blade rigidly in desired cutting position.



TAMPING ROLLERS
SCRAPERS • TRAILBUILDERS

LA PLANT-CHOATE MANUFACTURING CO. Inc.

RUBBER WHEELED WAGONS
BULLDOZERS • SNOW PLOWS

CEDAR RAPIDS, IOWA.

In SELF DEFENSE

for meeting schedules . . . earning just profits

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For Jews . . . . . Page 12

22 Pages 2 Cents

H BUY 500 AIRPLANES

S.; MARTIN WILL SUPPLY

D DOUBLE HIS PLANT

Firm Here Rushes Expansion Work For Completion In 11 Weeks

Work has been started on an addition to the Glenn L. Martin Company's aircraft factory at Middle River which will make the plant one of the largest in the world.

Mr. Martin disclosed yesterday that crews are working twenty-four hours a day excavating for the foundation of the building, which, he said, will be completed in eleven weeks at a total cost, with equipment, of close to $3,000,000.

The cost and size of the undertaking —the new structure will nearly double the floor space of the plant—and the speed with which it is being carried out lent added significance to the announcement made last night by the French Embassy that Martin has been awarded a contract by the French Government for a large number of light bombers.

Division Of Orders

It was disclosed that Administration officials had lent nearly assistance to France in her effort to increase her lagging air strength by purchases from private American factories.

The embassy announced that the orders for 500 planes were divided among the following American firms:

Douglas, Los Angeles.

Curtiss, Buffalo.

Glenn Martin, Baltimore.

North American Aviation Corporation.

Last year the French placed orders for one hundred Curtiss-Wright pursuit planes at a cost of about $5,000,000. This year one hundred more ships of ordered. The latter

Eleven weeks to go! . . . to excavate, build a foundation and erect a factory with 440,000 square feet of floor space. Stiff orders for contractors bidding at today's prices . . . at *this* time of year, when thaws and severe rains made excavating conditions almost impossible. So, the job was given to *proved* equipment!

Between February 7 and 15, 30,000 yards were excavated and hauled an average of 1200 feet round-trip in 472 total working hours for the LeTourneau Carryall Scrapers. Working in a sea of muck, bulk of the excavation was done first; then, while the first of the foundation was being laid the Carryalls went on to finish the grade . . . right down to the engineers' "blue tops", ahead of the foundation crew.

While two veterans (YR 12's) on the job loaded and dumped the sticky, gooey loads and spread them with comparative ease, two new models turned in far better performances. They give 3 yards greater capacity — operated by tractors of the same horsepower.

Plenty of large diameter, broad tread tires are engineered to these new Carryalls . . . to assist in loading and traveling. They show up best in mire and soft ground. And, as the superintendent remarked, they load easier than the smaller scrapers in spite of increased pay yards.

We might add that there's now a complete line of modernized Carryalls from 3 to 30 yards heaped measure that offer savings as advanced as the Carryall Scraper itself was a few years back. It's the world's most complete line of tractor drawn excavating equipment; and the only line that has job-proved itself on *all* types of work!

Your "Caterpillar" and LeTourneau dealer will gladly demonstrate the benefits on *your* job.

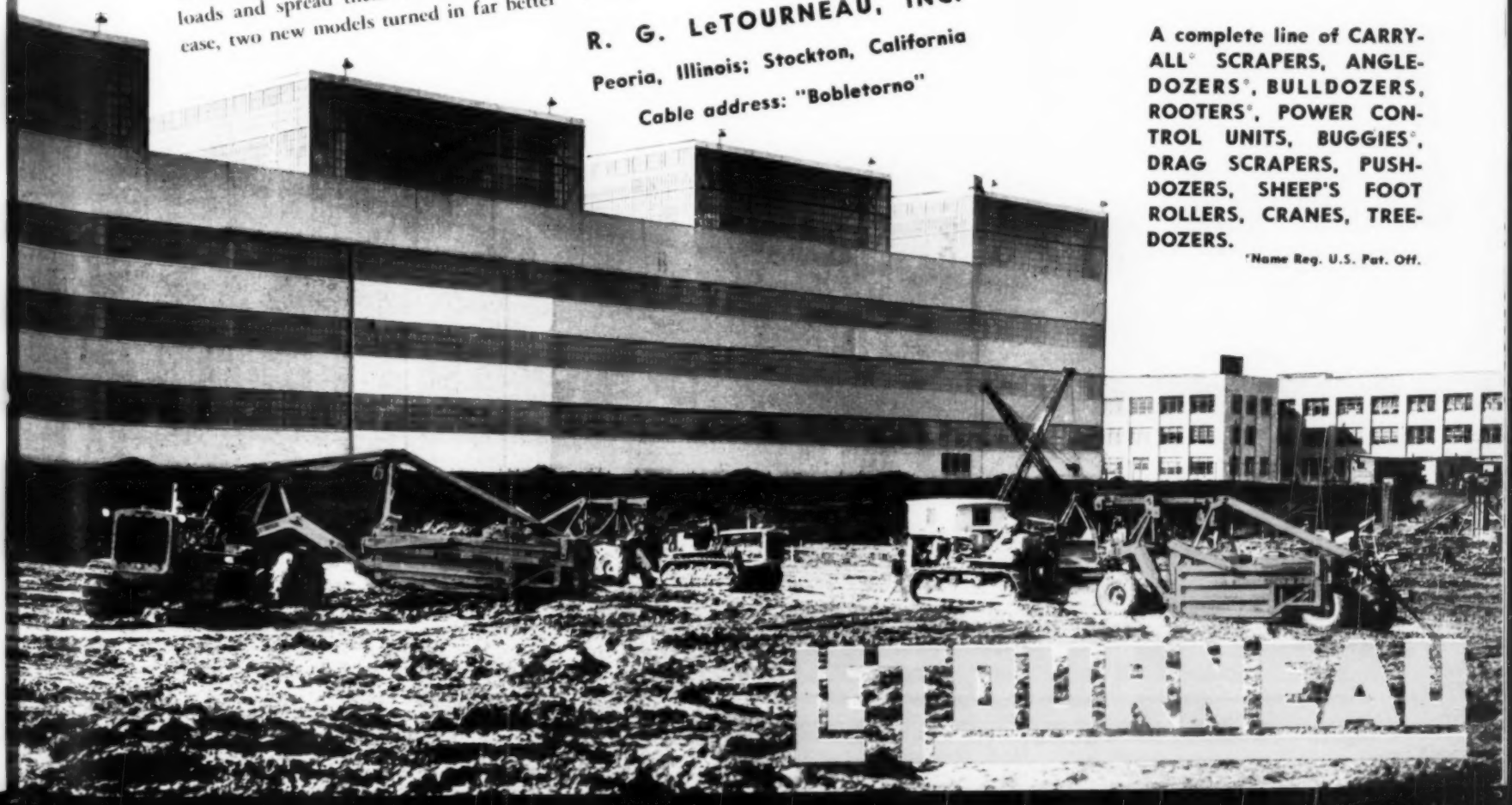
R. G. LeTOURNEAU, INC.

Peoria, Illinois; Stockton, California

Cable address: "Bobletorno"

A complete line of CARRYALL° SCRAPERS, ANGLEDOZERS°, BULLDOZERS, ROOTERS°, POWER CONTROL UNITS, BUGGIES°, DRAG SCRAPERS, PUSHDOZERS, SHEEP'S FOOT ROLLERS, CRANES, TREEDOZERS.

°Name Reg. U.S. Pat. Off.



ILLINOIS National Guard Armories, Sycamore and Mt. Vernon, Ill. Owner, State of Illinois. Consulting Engineer, S. E. Berkenblit, Chicago, Ill. Supervising Architect, S. Milton Eichberg. Technical Supervisor, Lieut. Joseph A. Crum. Contractor, Works Progress Administration, A. M. Crain, Director of Operations; Chas. E. Miner, State Administrator.

LEHIGH
EARLY STRENGTH
CEMENT

3,000 lb. Concrete at 3 Days Specified

ARCHES FOR 13 ARMORIES POURED WITH 3 SETS FORMS

Made possible by early strength cement

Efficiency in planning and the use of a type portland cement to produce concrete with a compressive strength test of 3000 lbs. at 3 days, saved time and money in constructing thirteen armories for the State of Illinois.

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STANDARDIZED MATERIAL HANDLING MACHINES

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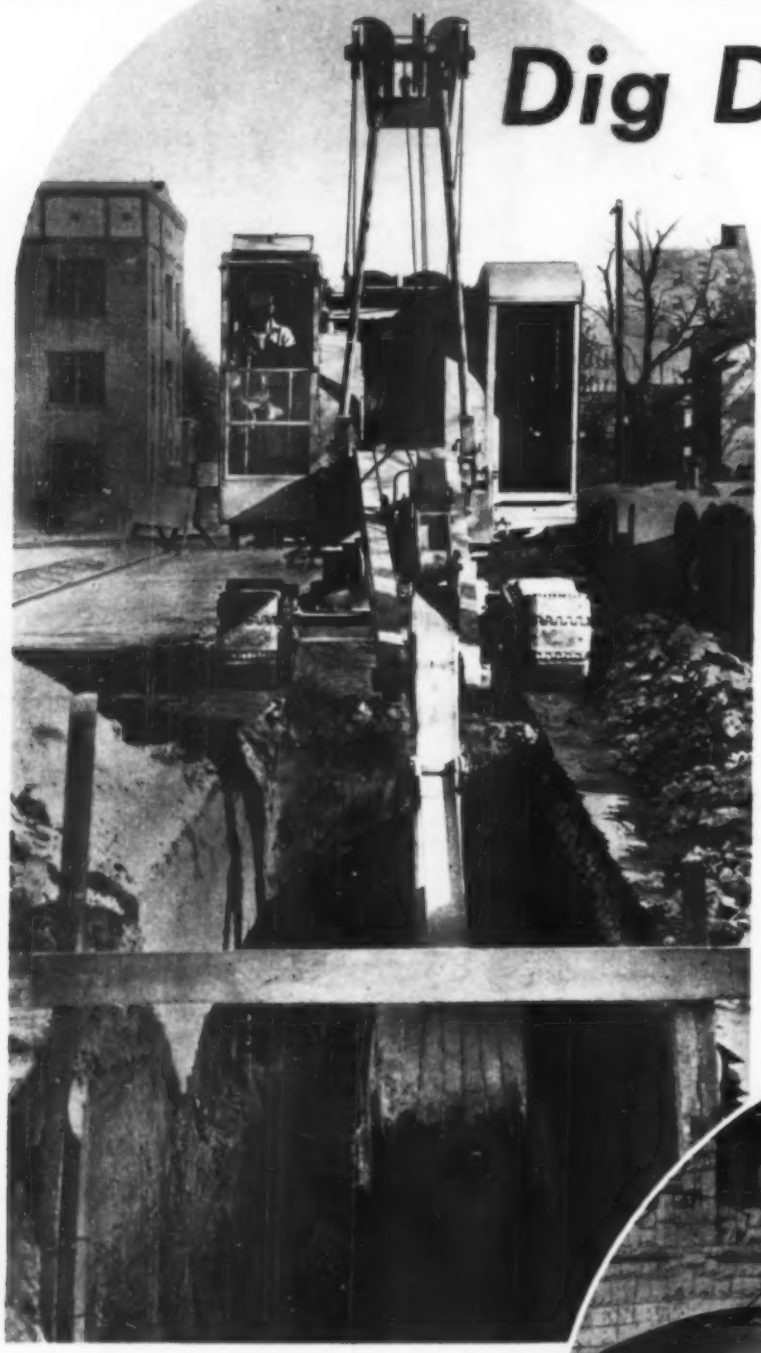

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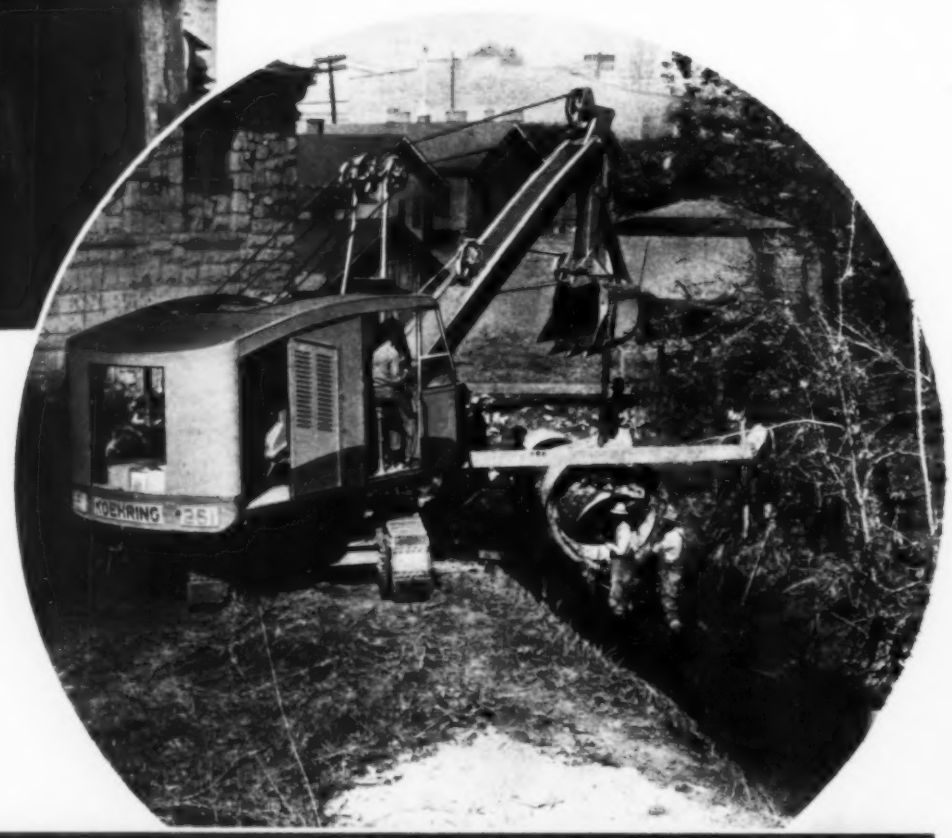

Deep sewer trench excavation through hard surface and old macadam road bed. Pipe is placed in trench with pull shovel.

Laying heavy sewer pipe in shallow trenches with Koehring Pull Shovel. Trench was previously cleaned by pull shovel.

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HEAVY-DUTY CONSTRUCTION EQUIPMENT

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Construction
Methods and Equipment

ROBERT K. TOMLIN, Editor

Volume 21 | May, 1939 | Number 5

CANAL SHAPED BY MACHINE

SIDE SLOPES AND SUBGRADE of Contra Costa canal, part of U. S. Bureau of Reclamation's Central Valley Project near Antioch, Calif., are accurately trimmed by special machine (*below*) spanning ditch and riding on rails along berms. Outfit hauled by tractor delivers earth from finishing cut to vertical bucket elevator which delivers to belt conveyor, discharging spoil along bank. In wake of trimming machine steel reinforcement (*right*) is set on sides and bottom of cut prior to placing concrete lining.

This Month's NEWS REEL

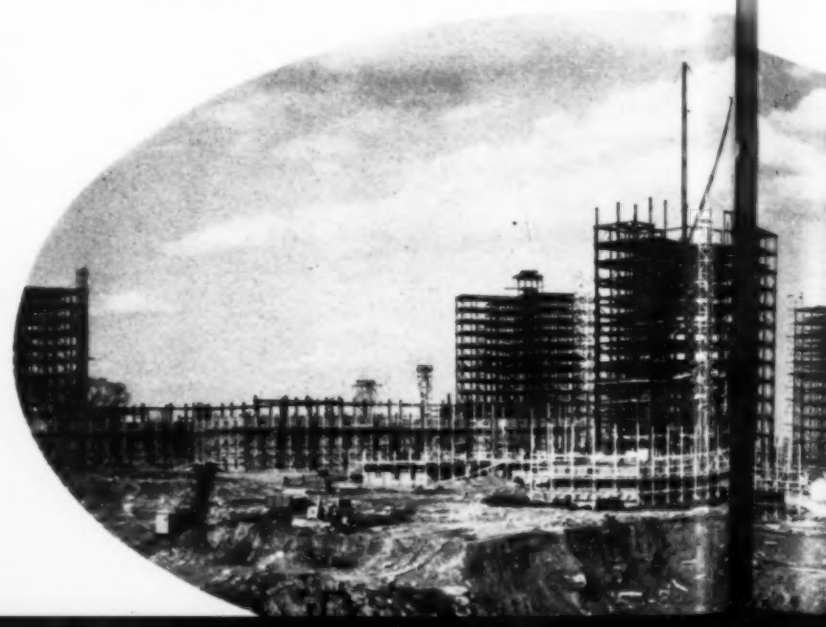
OREGON'S NEW STATE CAPITOL at Salem, built with the aid of PWA funds, illustrates the modern type of public buildings erected in the program of the Public Works Administration. Replacing the old capitol which was destroyed by fire, it is capped with a symbolic figure of a woodsman facing the Oregon Trail.

RUSH JOB FOR AIRCRAFT PRODUCTION (right). Eleven weeks was the scheduled time for completing a new 694x340-ft. two-story factory building at the aircraft plant of the Glenn L. Martin Co., Middle River, Md. Designed by Albert Kahn, Inc., of Detroit, the structure will provide 440,000 sq.ft. of additional manufacturing space for handling undelivered orders which, on March 1, totaled $30,309,083. Working three shifts per 24 hr. the contractors for the project included A. V. Williams, Washington, D. C. (excavation); Turner Construction Co., New York (foundation); American Bridge Co., Pittsburgh (structural steel). Including $900,000 worth of machine tools, the cost of the expanded factory facilities will amount to about $2,750,000.

TO INCREASE DRAGLINE OUTPUT a new attachment called the "Dragveyor," for loading trucks, is being operated at Hansen dam in California by Guy F. Atkinson Co., contractor. Designed by Garlinghouse Bros., of Los Angeles, the device consists essentially of a transverse, inclined belt conveyor fed with earth by a hopper with an inclined loading apron up which the contents of an 8-cu.yd. Crescent bottomless scraper bucket on a 100-B Bucyrus-Erie dragline, is dragged — not lifted vertically — and dumped. Trucks of 18-cu.yd. capacity are spotted under the elevated end of the belt conveyor and are quickly filled with a continuous stream of spoil, rather than loaded intermittently by the dragline bucket. The conveyor, 69 ft. long, is equipped with a belt 60 in. wide operated at a speed of 250 ft. per minute and provides a 12-ft. loading height. At 50 per cent continuous loading the capacity of the device, which weighs 47½ tons, is rated at 700 cu.yd. per hour.

CONCRETE LINING (below) is placed on a curved section of the 99 mi. of canal which will carry Yakima River water to the 72,000 acres of the U. S. Bureau of Reclamation's Roza division project in the State of Washington. Concrete in buckets is fed to lining machine, which travels on rails along canal banks, by long boom of walking dragline previously used to excavate canal section.

LARGEST HOUSING PROJECT (below) in United States rises towards clouds above borough of The Bronx, New York, as Starrett Bros. & Eken, general contractors, push construction of Metropolitan Life Insurance Co.'s apartment community to house 12,312 families in fireproof buildings of varying heights, averaging seven to eight stories and occupying 27.4 per cent of land area on 129-acre site. First buildings are expected to be ready for occupancy toward the end of the year.



NEW MANHATTAN APPROACH RAMP to George Washington bridge across Hudson River between New York City and Fort Lee, N. J., is opened to traffic. Trafficway crosses Riverside Drive on concrete barrel arches of 196-ft. span built with aid of mobile timber falsework by Walter Kidde Constructors, Inc.

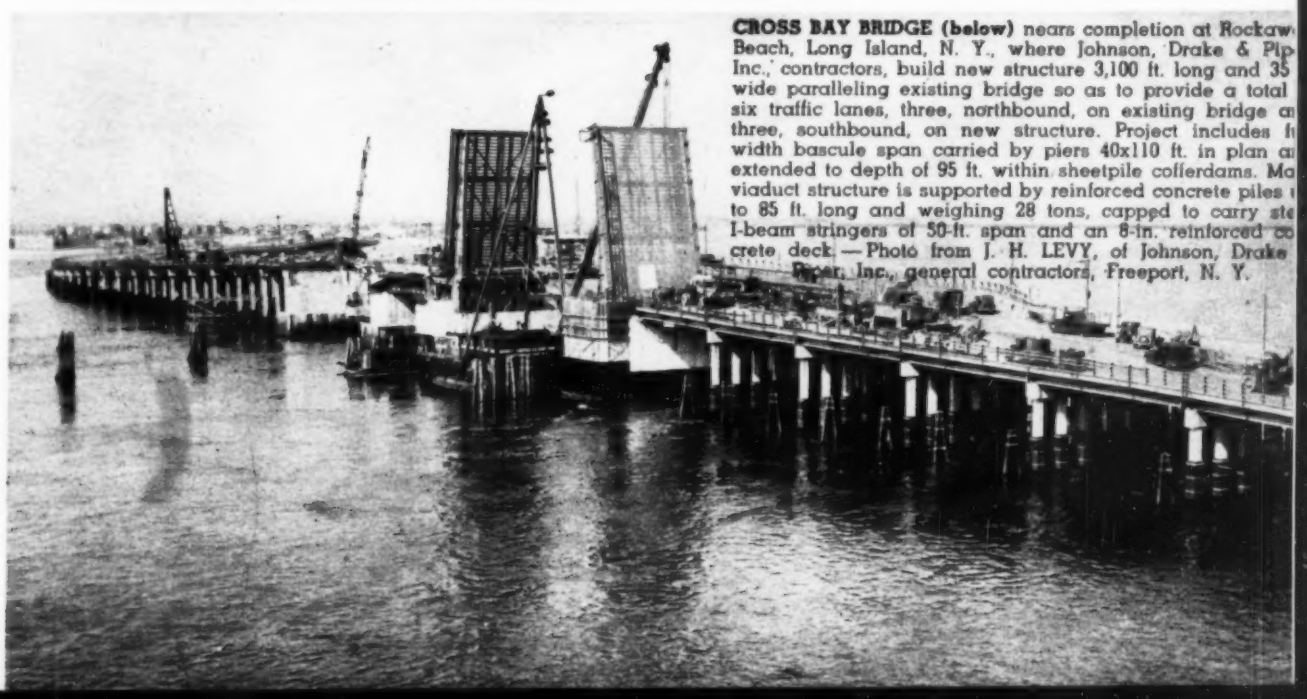
Wide World Photo

Wide World Photo

BRONX-WHITESTONE BRIDGE across East River, being rushed to completion to serve traffic for New York World's Fair, is subject of field inspection by prominent engineers and officials. (Left to right) O. H. AMMAN, director of engineering, Port of New York Authority; COMMISSIONER ROBERT MOSES of City's Department of Parks; COL. H. W. HUDSON, construction engineer for Madigan-Hyland; M. J. MADIGAN, of Madigan-Hyland, consulting engineers; and JAMES A. BURKE, member of City Council.

Wide World Photo

"COMING DOWN PARTY" (left) is staged at Hotel McAlpin, New York City, for workers of Harris Structural Steel Co. to mark completion of demolition of Sixth Ave. Elevated Railway. HARRY STETLER, foreman of wrecking crew, presents piece of steel structure to JOHN J. WOELFLE, hotel manager, as THOMAS HARRIS (with striped tie), head of contracting company which handled the razing of the historic structure, looks on.



CROSS BAY BRIDGE (below) nears completion at Rockaw Beach, Long Island, N. Y., where Johnson, Drake & Pip Inc., contractors, build new structure 3,100 ft. long and 35 wide paralleling existing bridge so as to provide a total six traffic lanes, three, northbound, on existing bridge a three, southbound, on new structure. Project includes f width bascule span carried by piers 40x110 ft. in plan a extended to depth of 95 ft. within sheetpile cofferdams. Ma viaduct structure is supported by reinforced concrete piles to 85 ft. long and weighing 28 tons, capped to carry ste I-beam stringers of 50-ft. span and an 8-in. reinforced co crete deck. — Photo from J. H. LEVY, of Johnson, Drake Piper, Inc., general contractors, Freeport, N. Y.

Contractor Sets

Fast Schedule

For Concreting

Three-Hinged Barrel Arch Roof

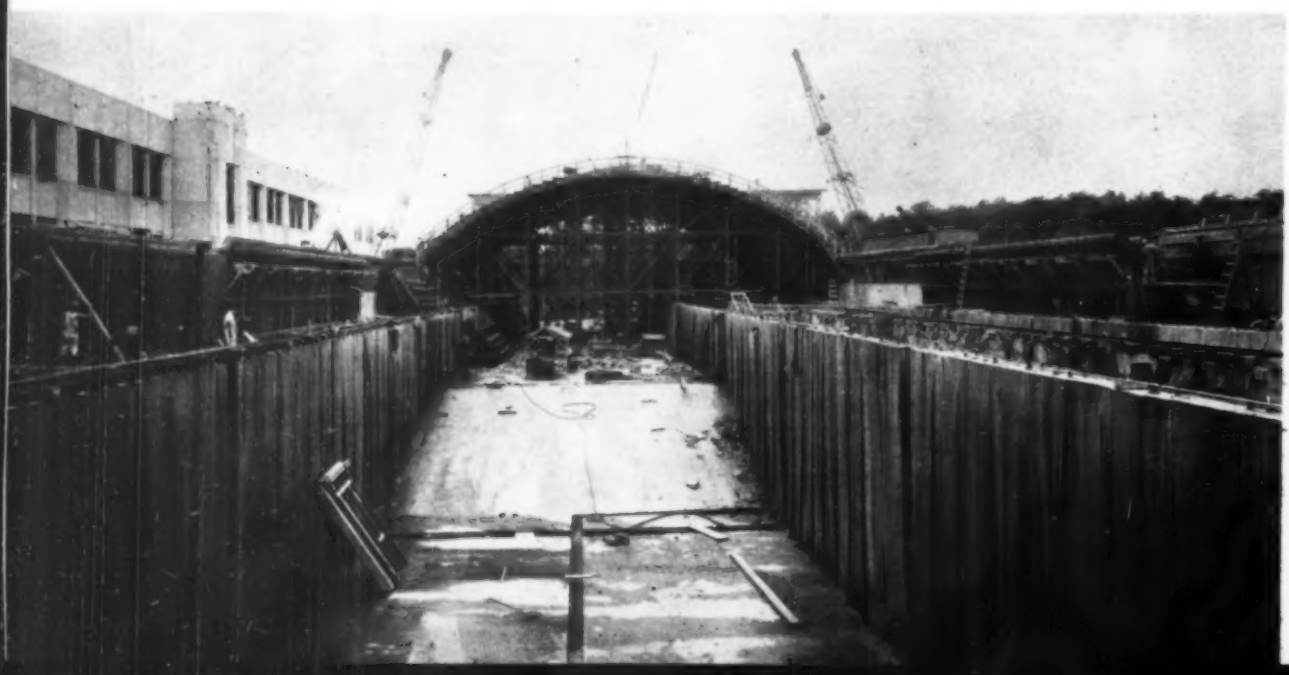
WITH STEEL COLUMNS (left) jacked up on timber sills at base, falsework carries load of arch steel and concrete placed on 2-in. thickness of fiber insulation. Timber joists spanning between cap channels on bents support wood lagging on which insulation rests. Hand winch at front of bent above rail line is used in pulling falsework forward.

WORKING TO TOLERANCES almost as fine as the proverbial gnat's hair, the Turner Construction Co., New York City, developed a job technique which assures completion for the Navy Department, 6 months ahead of contract date, of ship-model testing basins and unusual structures housing them and their auxiliary facilities at Carderock, Md., 5 mi. west of the District of Columbia line. Outstanding among the unusual structures is a three-hinged reinforced-concrete barrel arch of 112-ft. clear span, 1,118 ft. long, covering the main portion of a 1,302-ft. building inclosing the long testing basins. The contractor's construction procedure on this roof completed a 60-ft. arch unit every week for 19 weeks, with no time surrendered to storms or other adverse conditions.

Second only to the arch roof in construction interest is the exterior facing, consisting of thin precast exposed aggregate concrete panels, applied to all buildings and used as the outside form for structural concrete. Relying on 100 per cent bond with the poured concrete, one-half of the 2-in. thickness of these panels was figured by the designers as an effective part of the structure. An accompanying plan gives the principal dimensions of the buildings. Three buildings shown to form a continuous unit 870 ft. long by 54 ft. wide were designed as a reinforced-concrete rigid frame structure.

Close Tolerances — Only once in a blue moon does a contractor have to work to tolerances as close as those specified for the Navy Department's plant at Carderock. Extreme accuracy in construction was required for all structures, but the tolerances for the testing basins and the arch roof were particularly severe. Steel reinforcement of 1-in. round bars for the arch had to be set to a tolerance of $\frac{1}{8}$ in. in each half of the span. In the testing basins, concrete side walls had to be built within a maximum permissible deviation from a straight line of $\frac{1}{4}$ in. in 1,200 ft. The floor of the deep basin had to be finished to a tolerance of $\frac{1}{4}$ in. in 960 ft.; and the floor of the shallow basin, to a tolerance of $\frac{1}{8}$ in. in 300 ft. Some grinding was necessary to meet the latter requirement.

Even these close tolerances are completely outstripped by the standards to which the Navy Department works in setting steel rails designed to carry the self-propelled gantry carriage which will pull the ship models in the basins. The Department engineers are laying these rails to the curvature of the earth's surface, paralleling the surface of the water in the testing



STEEL FALSEWORK (left) for 60-ft. section of barrel arch roof having 112-ft. clear span comprises eleven bents with five columns in each bent. Haunch walls at two sides of building are concreted in sectional timber forms lined with pressed composition board. Basin walls, in foreground, constructed by placing concrete between jagged rock backwall and steel-lined timber forms, are protected with dripping wet burlap until arrival of cool September weather. To avoid contraction cracks, 2-ft. slots in basin floor and walls are not filled with concrete until winter, when building is completely inclosed.

basins, with a middle ordinate of about 3/16 in. for the 1,200 ft. of track required. Rails weighing 165 lb. to the yard, ground to perfect smoothness, rest on cast-steel chairs set in concrete. In aligning the rails and producing the desired vertical curve, the engineers work to a horizontal tolerance of 0.01 in. in 1,200 ft. and to a vertical tolerance of 0.005 in. in 1,200 ft.

Three-Hinged Arch Roof — From the contractor's viewpoint, the three-hinged barrel arch roof was the critical factor in the progress of the job. The arch has a span of 110 ft. between haunch hinges and a span of 112 ft. at the springing line, with a rise of 24½ ft. from the springing line to the underside of the barrel at the crown, where the third hinge is incorporated in the arch.

Ring thickness of the arch is 12 in. at the haunches and 8 in. at the crown, and the thin arch section is heavily reinforced with plain round bars. Mesnager hinges used at the haunches and the crown consist of two layers of smooth round bars intersecting at the midpoint of the open hinge joint, as indicated by several of the accompanying illustrations. The hinge bars are concreted in the slab to develop bond strength sufficient to resist arch thrust; free flexing of the bars in the open joints relieves the arch slabs of internal stresses and makes the structure statically determinate in the same way as a three-hinged steel arch, permitting economies in the use of thin sections. Extreme accuracy required in setting hinges and reinforcing steel presented problems which the contractor had to solve in order to attain equal economies in erection.

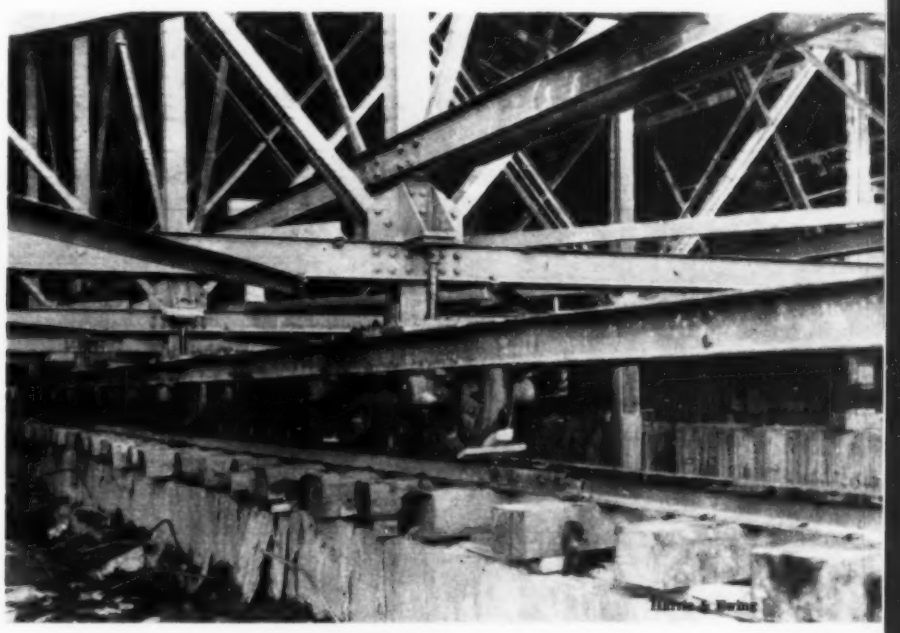
As a three-hinged barrel arch designed with Mesnager hinges had no precedent in this country, the Navy Department built a quarter-scale model of a complete roof unit and tested it to destruction before advertising the job. Test results confirmed calculations used in the design.

Traveling Arch Falsework — As a step toward reducing the investment in construction plant necessary to build the roof, the original arch design provided contraction joints at 30-ft. intervals between expansion joints 120 ft. apart. Analyses of the job by the successful bidder showed that a set of traveling steel falsework less than 60 ft. in length would not be economical, and the 60-ft. length accordingly was designed and used. After concreting the first two sections at the west end of the roof in 30-ft. pours, the Navy Department increased the distance between joints to 60 ft., and the remainder of the roof was built in 60-ft. units. A broader base under the arch ring at the two haunches appeared to produce steadier movement in the arch as it settled when the centering was lowered.

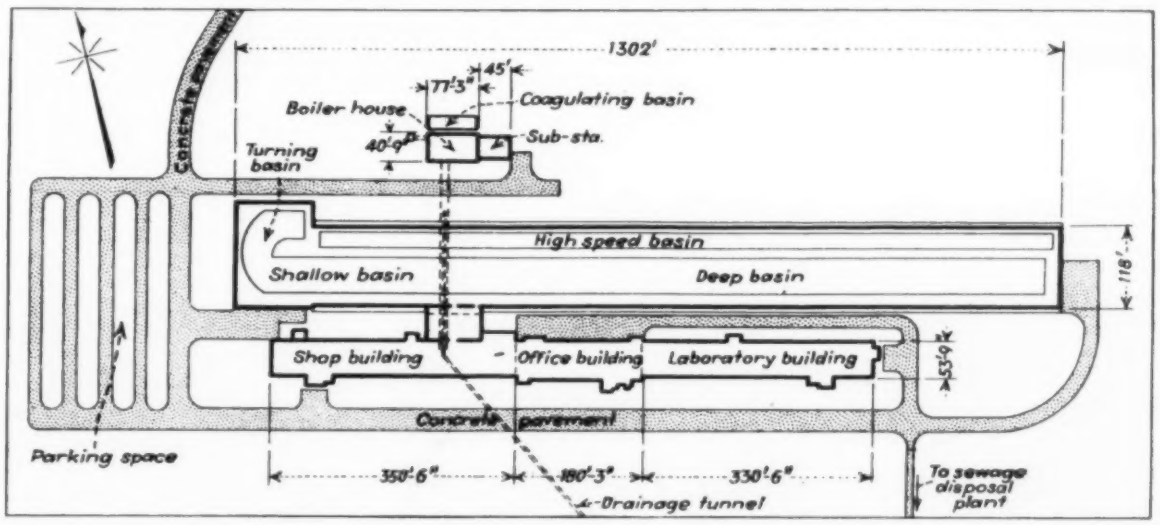
Vertical load-bearing members of the falsework consisted of five rows

PREFABRICATED MAT of arch reinforcement, 10 ft. wide by 62 ft. long, weighing 4½ tons, is swung into place with aid of strong-back handled by whirley. Arch deck has been covered with slabs of cemented fiber insulation.

INTERSECTING STEEL BARS of haunch hinge, prefabricated in welded four-bar units, are locked firmly in position for concreting with bolted timber yokes and spacing templets.



DOUBLE-FLANGED TANDEM WHEELS under individual columns of two bents on rail lines carry falsework during movement.



GROUND PLAN of Navy Department's ship-model testing basins near Washington, D. C., indicates outside dimensions of structures housing basins and auxiliary facilities.

SUPPORTED ON STEEL CHAIRS above fiber insulation, arch reinforcement includes bar joists added by contractor to assure rigidity and to avoid displacement of steel while bar mat is being handled.

DRIBBLED INTO PLACE from roller-gate bucket handled by whirley, concrete in arch roof is consolidated with hydraulic vibrators driven by portable gasoline-powered pumps.

HYDRAULIC VIBRATOR (left), operated by oil under pressure in tubes incased in rubber hose, assists flow of concrete around bars of arch reinforcement.

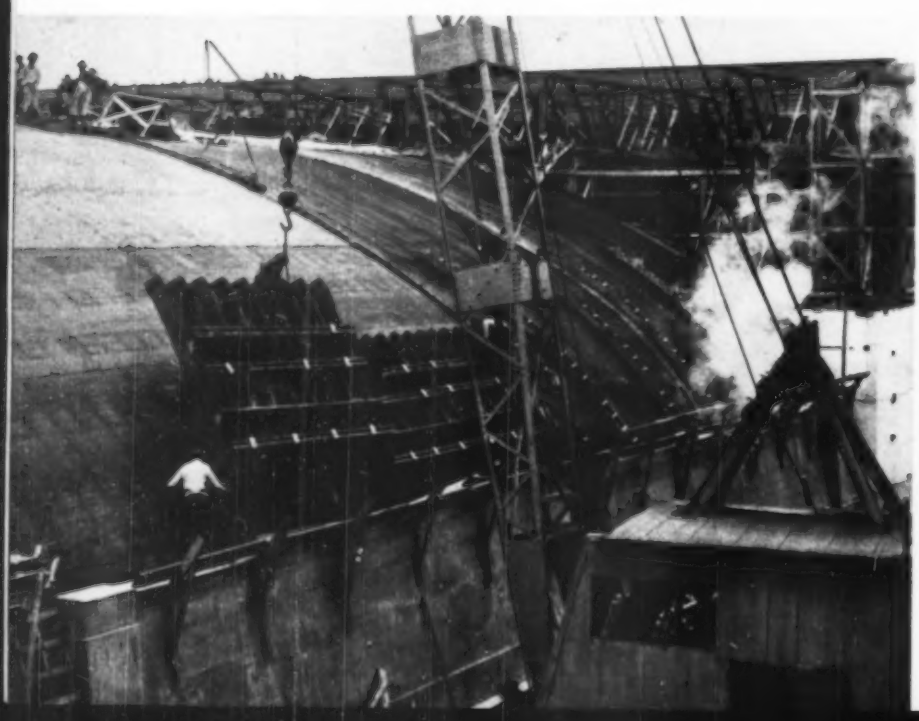
of steel posts, with eleven posts in each row. The columns were tied and braced longitudinally and transversely to give lateral support and to make the falsework self-supporting while it was being moved on two lines of steel rails spaced at unequal distances from the center line. Double-flanged wheels mounted in tandem under the columns on the two rail lines rolled the falsework from one position to the next.

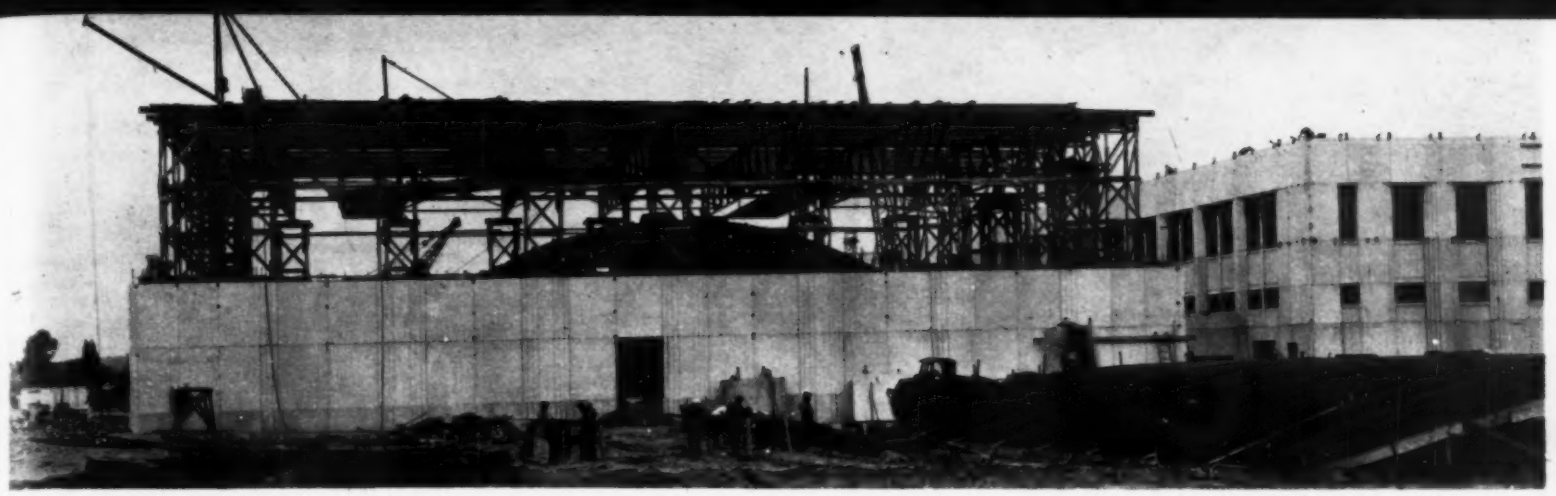
When in position for a pour, all posts were jacked to desired elevation by screw jacks at the bottoms of the columns. These jacks were used again in lowering the deck by a symmetrical procedure which started with the two bents nearest the haunches and progressed uniformly from bent to bent under the two halves of the arch toward the center.

Longitudinal steel channel stringers capped ten falsework bents. On these channels rested timber joists cut to the curvature of the arch. Longitudinal timber lagging was nailed to the curved upper face of the joists, and on this lagging was placed 2-in.-thick Thermax insulation consisting of wood fibers (shavings) cemented with a magnesite binder in compressed slabs of convenient size. Reinforcing steel was set in position on top of the insulation.

Reinforcing Steel — Closely spaced 1-in. smooth round bars for each half of the arch were prefabricated on the

BACK FORMS (below) extending 22 ft. above haunch hinge are stripped by whirley. Arch roof is concreted in 60-ft. units.





STEEL ROOF TRUSSES of turning basin building are erected in advance on wood towers to avoid possible damage to bearing walls of concrete faced with precast exposed-aggregate panels. At right are frames on which workmen assemble prefabricated arch mats.

job into mats 10 ft. wide weighing 4½ tons each. Six of these mats went into each half of a 60-ft. roof unit — a total of twelve mats for the full 60-ft. arch ring. Whirler cranes traveling on tracks along both sides of the building handled the mats into position with carrier frames (strongbacks). The contractor incorporated welded bar trusses in the prefabricated units to hold the arch bar mats in position while being handled. Prefabrication cut labor costs on arch reinforcement 80 per cent after the process had become standardized.

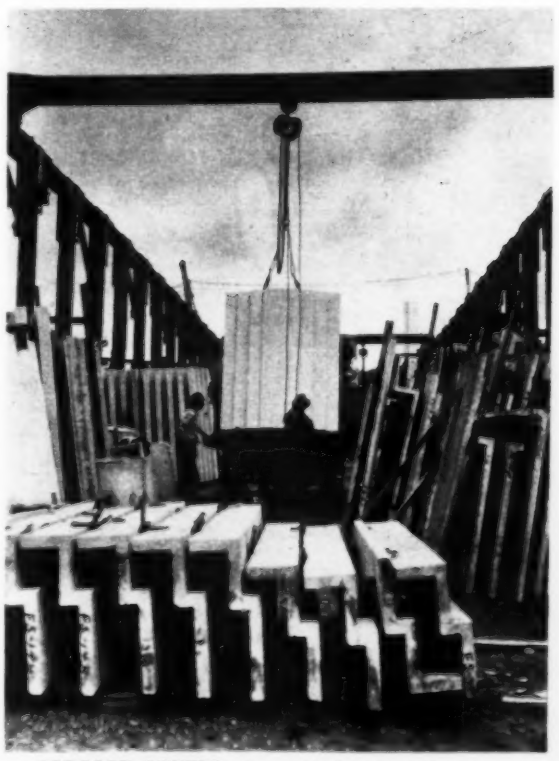
Concrete — Structural concrete on this contract closely approximated 1:1.82:3.50 mixture, made up of bulk cement, sand, two sizes of crushed rock and water, all ingredients being proportioned by automatic weight batching under immediate supervision of a Navy Department inspector. Time locks on two 1½-yd. mixers in the concrete plant were set to give 1½-min. mixing. The two mixers discharged into the boot of a belt conveyor which delivered to an elevated hopper for loading 3-yd. truck mixers. Remixing of the concrete in the truck-mixer drums continued for an average of about 5 min. The mixing plant had a capacity of 90 cu.yd. an hour. Four 3-yd. truck mixers sufficed to deliver 234 cu.yd. required for a 60-ft. roof pour in 5 hr.

Arch concrete contained high-early-strength cement which, under the mixing conditions here outlined, developed a compressive strength of 3,500 lb. per square inch in about 90 hr. Specifications required leaving forms in place 96 hr. under the arch, but this requirement was reduced during the course of the job in favor of cylinder tests which showed specified strength of 3,000 lb. in shorter periods. Extreme fiber stress in the arch was about 500 lb. per square inch, and the 3,000-lb. strength was ample for safety.

As concrete was placed in the forms, it was vibrated with Jackson gasoline-powered hydraulic vibrators operating at about 7,500 v.p.m. The vibrators were equipped with vibrating elements about 2½ in. in diameter, energized by oil under pressure from an engine-driven pump on a portable wheelbarrow rig. Two flex-

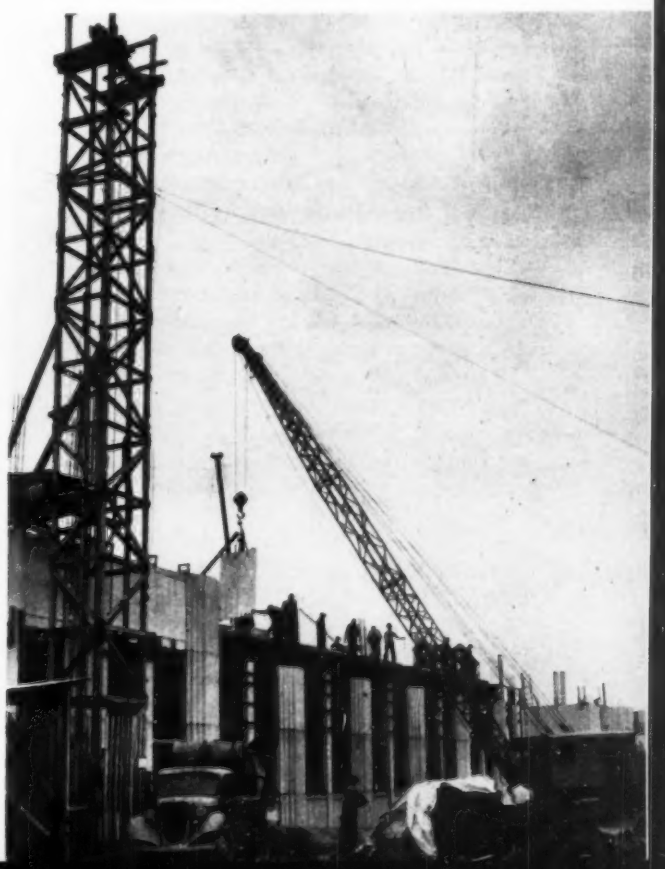
FALSE RIBS cover joints in barrel arch roof of long windowless building. Black waterproofing on outside of roof will be covered by aluminum paint.

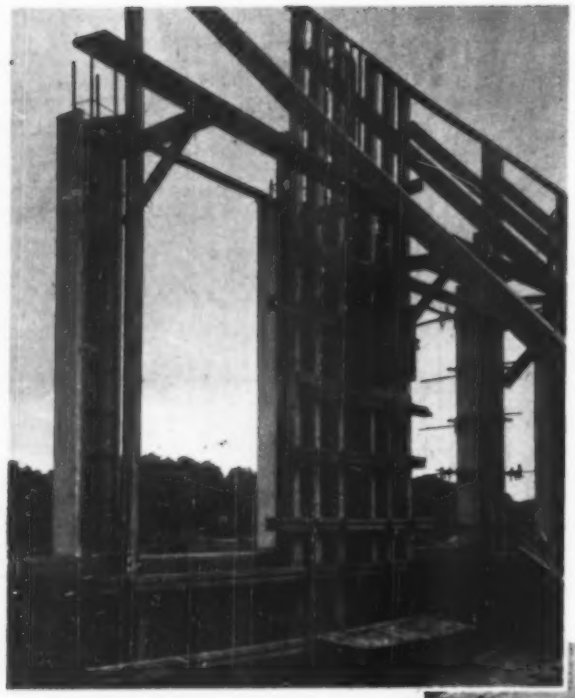
NAVY DEPARTMENT ESTABLISHMENT (left), for building and testing models of ships' hulls, uses 140,000 sq.ft. of precast concrete panels as facing for exterior walls. Long arch roof over testing basins will be brightened with metallic aluminum paint.



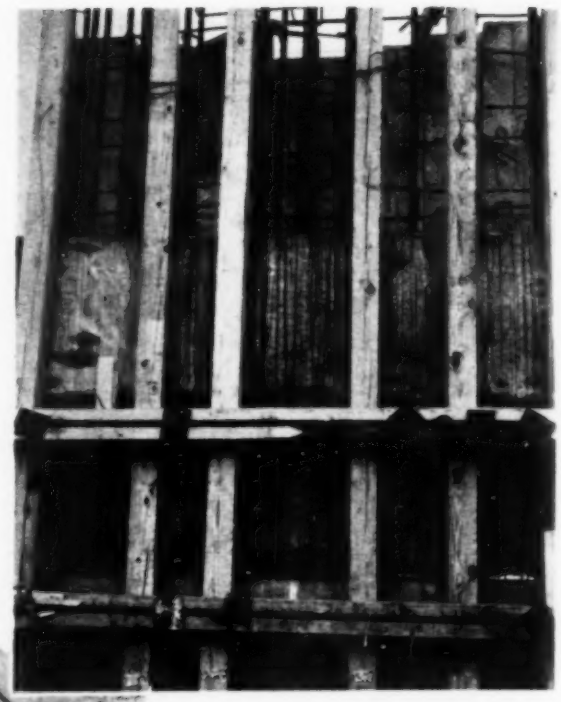
PRECAST PANELS of exposed-aggregate concrete only 2 in. thick are shipped and handled in units up to 9 ft. wide by 10¼ ft. high. Panel being loaded has eight square set-back corners, similar to those in smaller slabs on foreground.

SERVING AS OUTSIDE FORMS (below) for poured concrete walls of rigid-frame building, height of precast panels (erected by crane) determines height of concrete which can be placed in one lift. Truck mixer delivers concrete to tower at left.





TIMBER BACKFORM lined with plywood closes inner side of precast pier and column panels on second floor of rigid-frame building.



STRAP ANCHORS concreted in precast panels afford hold for threaded ties secured at inner ends against double wales.

ible copper tubes, a high-pressure tube and a low-pressure return line, incased in a rubber hose, connected the vibrating element to the pump. Hydraulic vibrators proved entirely satisfactory to the contractor, giving high frequency (with easier control and reduced time for vibrating) and eliminating replacement of spiral shafts required in rotary-type vibrators. Specifications limited vibrator capacity to 20 cu.yd. per hour per unit, and experience on the job showed this limit to be reasonable and fair.

Vibration of arch concrete had a tendency to cause concrete to flow on the steep slopes near the haunches. The contractor found it necessary to use back forms up to a height of 22 ft. Water (measured by weight) for the concrete placed in the back forms was restricted to a maximum of 6½ gal. per sack of cement. Above the back forms, the proportion of water in the concrete was reduced to about 6¼ gal. per sack.

Specifications required that structural concrete be cured under burlap kept continuously wet by sprinkling for 14 days. Basin walls concreted during the summer were protected by burlap kept continuously wet until the end of the hot weather in September.

Arch Hinges — Steel bars of the Mesnager hinges had to be set to an accuracy of less than ⅛ in. After experimenting with field bending of the bars in the haunch hinges of the first roof section, following the concreting of the haunch walls, the contractor placed an order with the Bethlehem Steel Co. to prefabricate all hinges to precise dimensions with welded stirrups. The prefabricated hinges were erected with slotted and bolted timber yokes which held them in exact position until concrete could be placed.

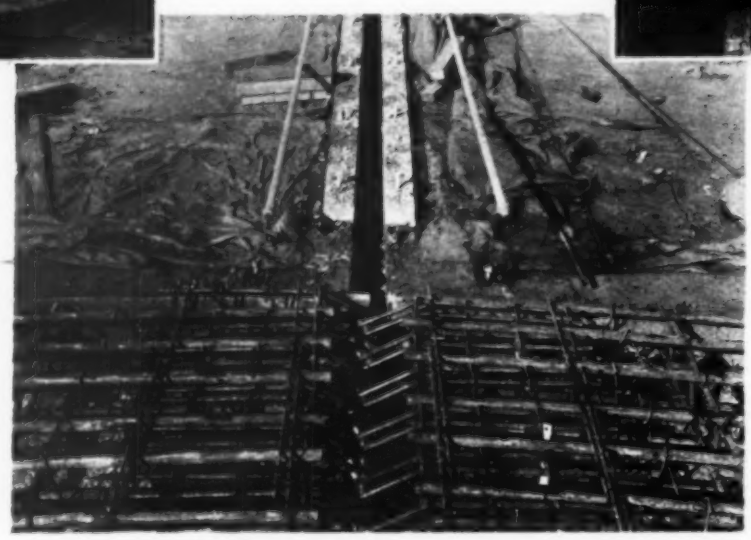
Arch Joints — Contraction joints midway between expansion joints are 3/16 in. wide. A greased steel plate, used to form this joint, was removed after the concrete had set.

Expansion joints at 120-ft. spacing are 1 in. wide and are filled with special premolded cork filler strips. The construction crew placed the cork filler against the face of the poured arch before concreting the adjacent section. When the falsework was lowered, allowing the arch to settle, the new concrete had a tendency to drag the cork filler and force it down through the 2-in. insulation under the roof.

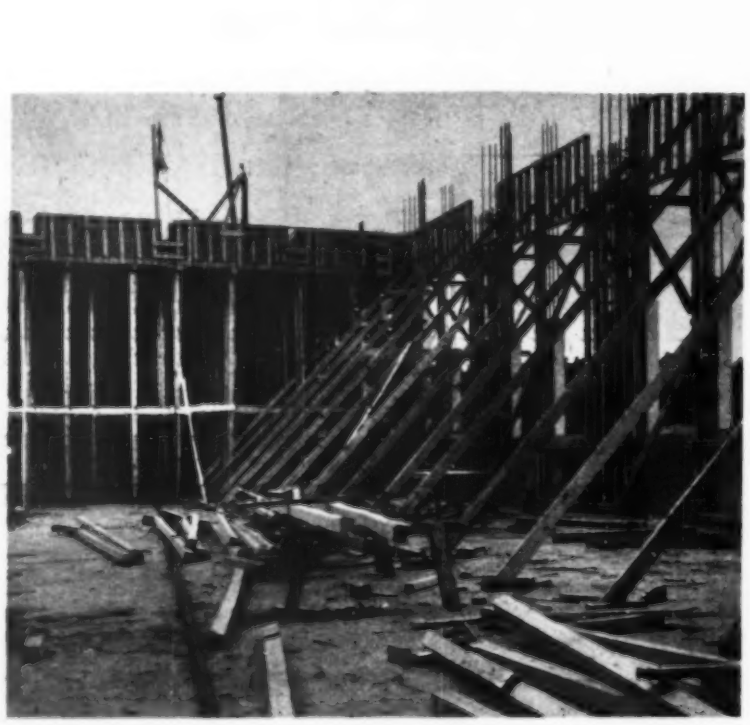
Arch Schedule — After making expected slow progress on the two 30-ft. roof sections poured at the start, while the crew was learning its routine and kinks were being worked out, the contractor settled down to steady progress of one complete 60-ft. arch ring per week, continuing this rate of construction for 18 weeks and completing a 38-ft. final section in 5 days. During the 18-week period, an arch was concreted every Thursday, permitting the falsework to be struck and moved on Monday. Two days sufficed to adjust the form to its new position and to place insulation and reinforcing steel. For the final 38-ft. arch, forms were moved into position on Monday, and concrete was placed the following day, the Tuesday before Thanksgiving.

Whirler Cranes—A complete mixing plant and two Clyde Wiley whirleys were available for this job from the contractor's dam and lock work on the Mississippi River at Alton, Ill. The two steam whirleys with their 85-ft. booms were ideal equipment for the long arch roof, erecting the steel falsework and handling insulation, reinforcing mats and concrete. This last material was dribbled to place from 1-yd. roller-gate buckets on the long booms.

Tracks for the two whirleys were laid on both sides of the building. One whirler crane with a 14-ft. turning circle operated on the open side of the long structure, and a second



CROWN HINGE BARS rest in timber templet on insulation mat. Shoulders of false rib to cover crown joint appear in background, where perforated pipes feed water to burlap curing mats.



TIMBER RAKERS anchor stud framing against which plywood forms are placed. Precast facing panels and plywood inner forms are erected to same level for concreting.

(*Continued on page 66*)

Changes Urged in Labor Relations Act

LABOR STRIFE WILL PERSIST UNTIL ALL PERSONS "STAND EQUALLY BEFORE LAW," SAYS MANUFACTURERS' ASSOCIATION

LABOR STRIFE in America will persist until all persons "stand equally before the law," the National Association of Manufacturers declared recently in demanding amendment of the Wagner Labor Relations Act on eight major counts. The association's statement was accompanied by a symposium of public opinion throughout the country. The symposium embraced expressions critical of the Act or its administration by legislators, labor leaders, businessmen, newspapers, columnists, judges, lawyers, farmers, doctors, educators and the general public.

The position of the National Association of Manufacturers, as outlined by the statement, is "that there can be no permanent solution of labor problems so long as the law places restraints upon one party to the employer-employee relationship, and leaves the other party free of all restraint." It was added: "Neither can there be a permanent solution until the right of free association on the part of employers and freedom of action on their part, so long as they do not commit unfair practices, is recognized to the same extent as it is in the case of employees; nor can there be any public confidence in the agencies established to administer the National Labor Policy unless all persons stand equally before the law and the administrative agencies with full and equal rights to fair hearings and impartial decisions."

Act Assailed on Eight Points

The eight points on which the N.A.M. assailed the Act and the corrective proposals advanced were:

(1) The Act now deals only with those labor disputes which are caused by unfair practices on the part of employers, or by refusal on their part to bargain collectively with the representatives of their employees. The objective should, therefore, be restated so as to recognize that employers are not the only people whose practices may cause and have caused obstructions to, and burdens upon, interstate commerce.

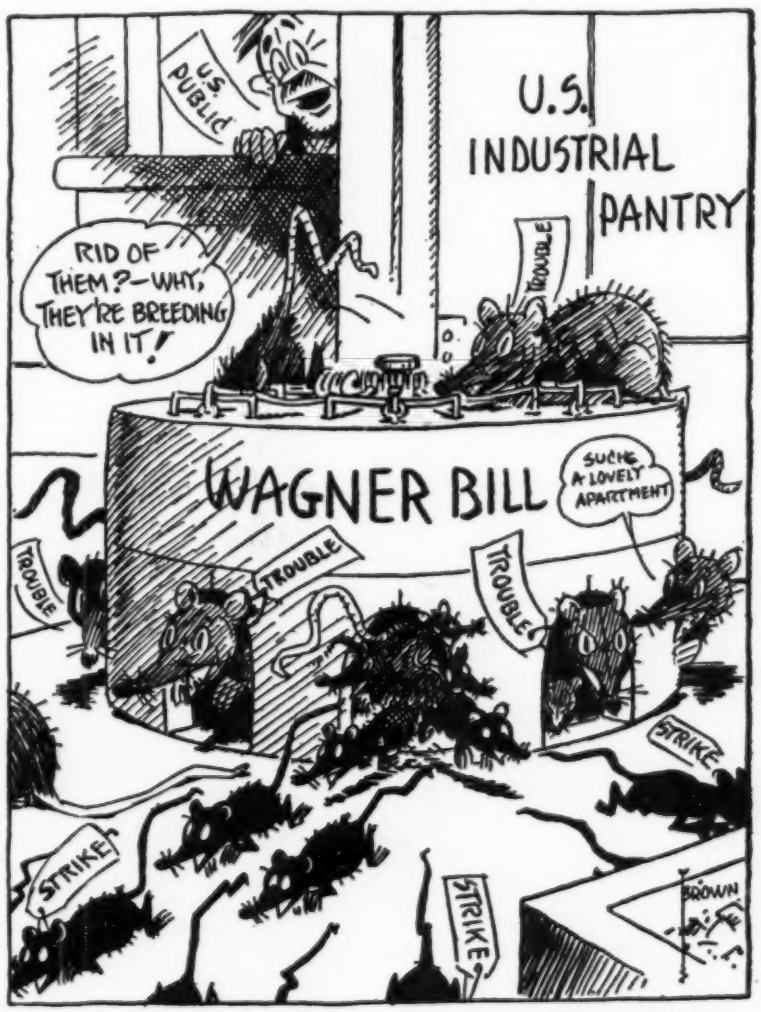
(2) The Act has apparently been interpreted by its administrative agency, the National Labor Relations Board, as a mandate to lend their efforts under all circumstances to the agencies of unionization. The function of the government should be properly confined to protection of the right of employees to organize, select their bargaining representatives and bargain collectively voluntarily.

(3) The Act now prohibits interference, restraint and coercion on the part of employers against employees. Only a person who closes his eyes and ears can be unconscious of the fact that there has been widespread coercion practiced against employees and against employers, and thus substantial injury to the public itself, by labor organizations and those acting under their instructions. The Act, therefore, should be equalized by prohibiting certain unfair labor practices on the part of employees and labor organizations, as well as on the part of employers.

(4) Among the instruments most frequently used for the oppression of individual employees and minority groups are the closed shop, the check-off, and the so-called majority rule as it now stands in the National Labor Relations Act and as interpreted by the board in its decisions. The Act is defective in not also embodying definite safeguards for individual employees and minority groups who do not wish to affiliate with labor organizations, or to act through representatives of a temporary majority group, and should forbid the closed shop under which an employee may be required to join a labor organization as the price of obtaining or retaining employment. The check-off arrangement, under which employers deduct union dues from the wages of employees and turn them over to labor organizations, is a practice which should be forbidden. If a labor organization can exist on the merit of its services and benefits to employees, and procure their voluntary affiliation and their voluntary financial support, it should be permitted to do so. The law, however, should not permit any arrangement under which either employers or labor organizations, or the two acting in concert, may compel the continued membership of a man in a labor organization or his financial support of same by enforced contributions, whether deducted by the employer and paid to the labor organization or exacted directly from the worker.

(5) The National Labor Relations Board has taken the position that even where an employer has entered into a collective agreement with a

(Continued on page 70)

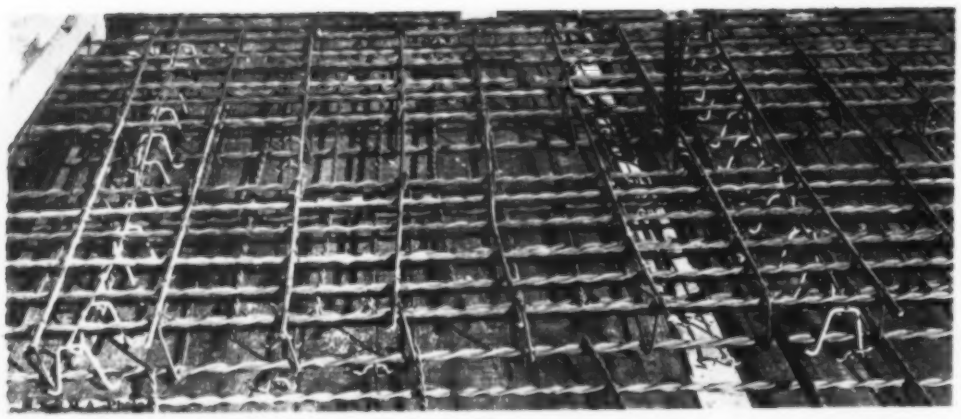


The New York Herald-Tribune

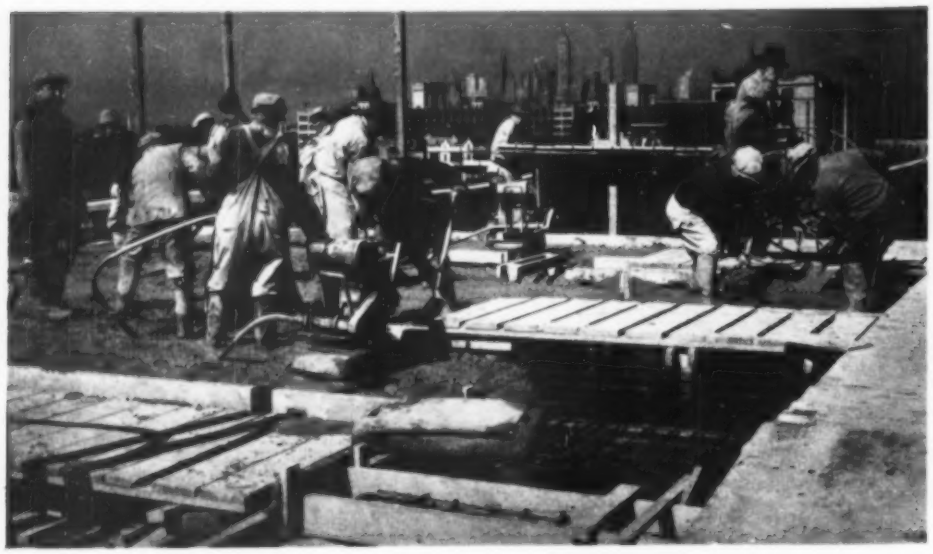
WORLD'S WORST MOUSETRAP

High-Strength Reinforcement

Reduce Slab Costs on RED HOOK HOUSES



COLD-TWISTED TWIN BARS replace standard steel in tension reinforcement at saving of one-third in weight, as result of 50 per cent higher working stresses permitted by building code. Twisted twin bars are here supported on chairs above first floor forms.



DUMPED AND SPREAD over slab forms supporting twisted twin-bar reinforcement, concrete is consolidated by flexible-shaft vibrators driven from portable gasoline engines.

BENT AT BENCHES on job, cold-twisted twin bars are made ready for setting by reinforcing crew. Single-pole scaffolds around buildings carry working platforms raised from floor to floor as construction advances.

FIRST GROUP of eight buildings at Red Hook Houses **(below)** rises rapidly during February. All of these buildings but one are topped out by first week in April. In right background appear first floors and first-story walls of some buildings in contractor's second group.

TWO IMPORTANT INNOVATIONS have helped the George A. Fuller Co., contractor, New York City, to reduce construction costs of reinforced-concrete floor and roof slabs totalling nearly 2,000,000 sq.ft in Red Hook Houses, $12,000,000 public housing project being erected near the South Brooklyn waterfront by the New York City Housing Authority under loan contract with the U. S. Housing Authority. Authorized substitution by the contractor of high-strength, twisted-dual-bar steel for standard reinforcement in girders and slab has earned a substantial credit for the owner on the original contract price. On concrete construction, use of the vacuum concrete process to remove excess water from the slab, as a means of expediting surface finish and strength development of the concrete, has produced savings for the contractor by reducing finishers' overtime, by assuring form stripping in the minimum specified period, and, in general, by hastening completion of the job. As a result of the general speeding up resulting from application of the vacuum process, one set of forms per building has proved ample to maintain rapid, continuous construction progress. An additional saving was obtained during the winter, when nearly 1,000,000 sq.ft. of slab was placed, by virtue of fast strength development in the concrete, which greatly reduced heating costs.

Concrete is dried out and compressed by the vacuum process immediately behind the screeds which strike off the freshly placed material, enabling the finishers to work about 20 ft. behind the spreading and vibrating crew. A total of seventeen men (one compressor engineer on the suction pump, two workmen handling

and Vacuumized Concrete

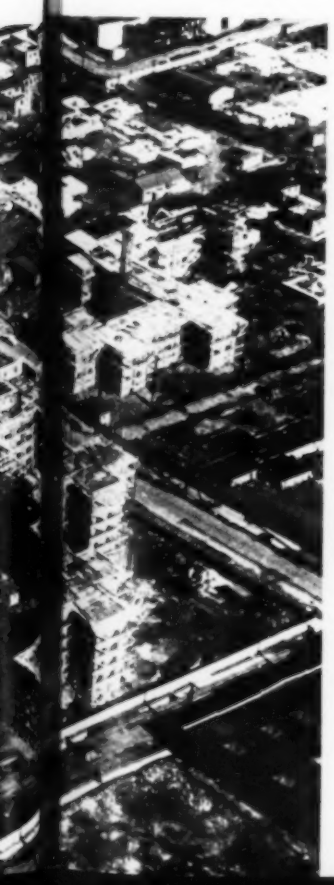
hose lines, four pulling screeds, two on vacuum mats, and eight giving the slab a float and trowel finish) completed an average of 12,500 sq.ft. per day during January and February and 14,500 sq.ft. per day during March, with a high record of 24,000 sq.ft. in one day, allowing 1 hr. overtime for the finishers.

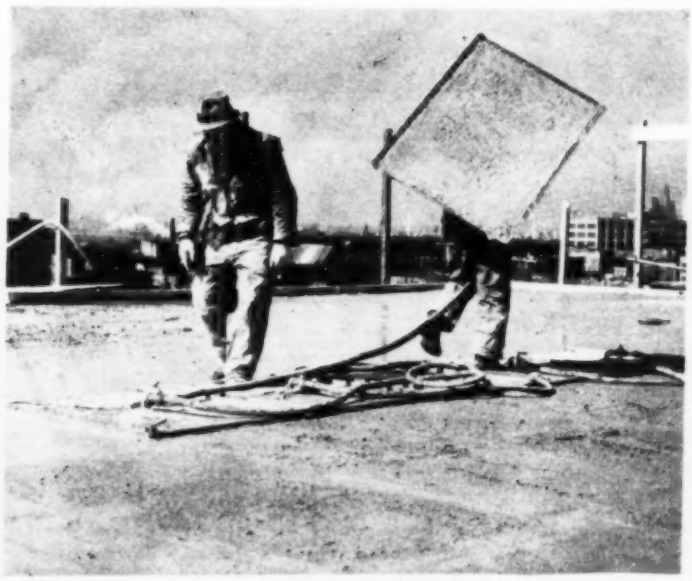
As the working day for New York building trades engaged in this kind of work is only 7 hr., the speed of slab construction is notable. By means of the vacuum process, it has been possible to place concrete every working day, Monday to Friday, inclusive, and to continue concreting even when caught by a moderate rain. Once forms and reinforcing had been placed, accumulation of snow was practically the only factor which caused interrup-

VACUUM MATS connected by hose lines to manifold remove excess water from concrete during brief application lasting 2½ to 4 min., leaving slab in condition for immediate finishing. Note contrast in surface ahead of mats and behind them.

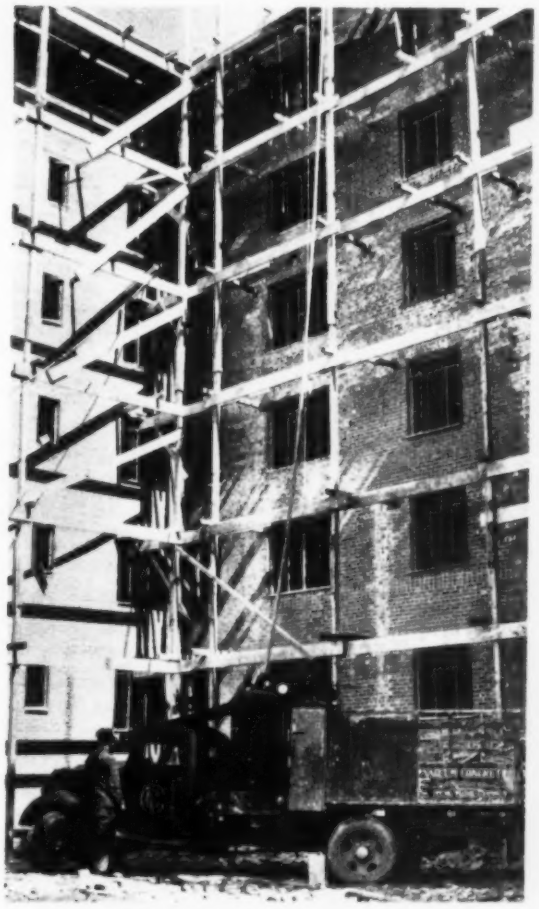
Rudy Arnold Air Photo

FINISHERS (left) follow vacuum mats closely, floating and troweling slab about 20 ft. behind dumping and spreading operation.

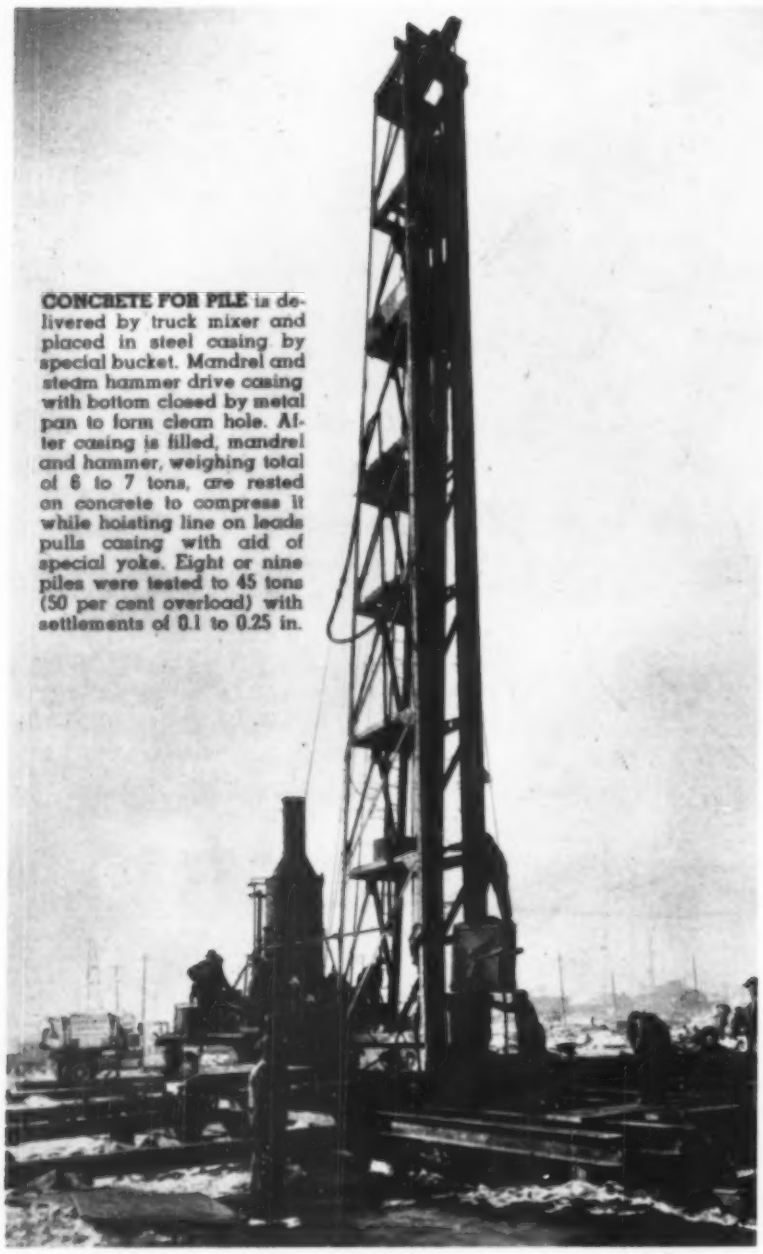




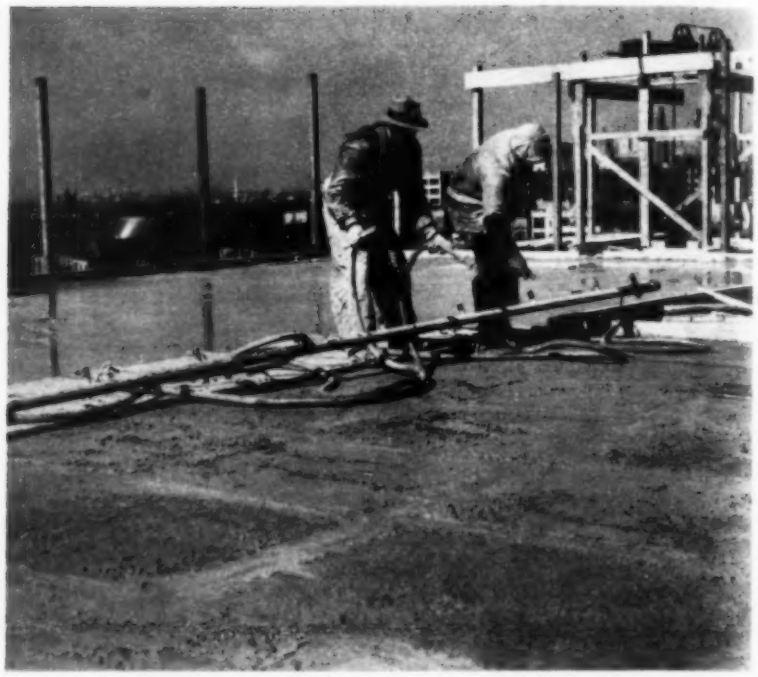
OF SIZE AND WEIGHT for handling by one man, 3x4-ft. mats can be carried without danger of workman's being blown off roof.



SUCTION PUMP mounted on truck and driven by power takeoff applies vacuum to mats through long hose line running up to slab being powered.



CONCRETE FOR PILE is delivered by truck mixer and placed in steel casing by special bucket. Mandrel and steam hammer drive casing with bottom closed by metal pan to form clean hole. After casing is filled, mandrel and hammer, weighing total of 6 to 7 tons, are rested on concrete to compress it while hoisting line on leads pulls casing with aid of special yoke. Eight or nine piles were tested to 45 tons (50 per cent overload) with settlements of 0.1 to 0.25 in.



WITH ONE WING COMPLETED, two men detach hose lines from manifold to move vacuum equipment to poured slab in background.

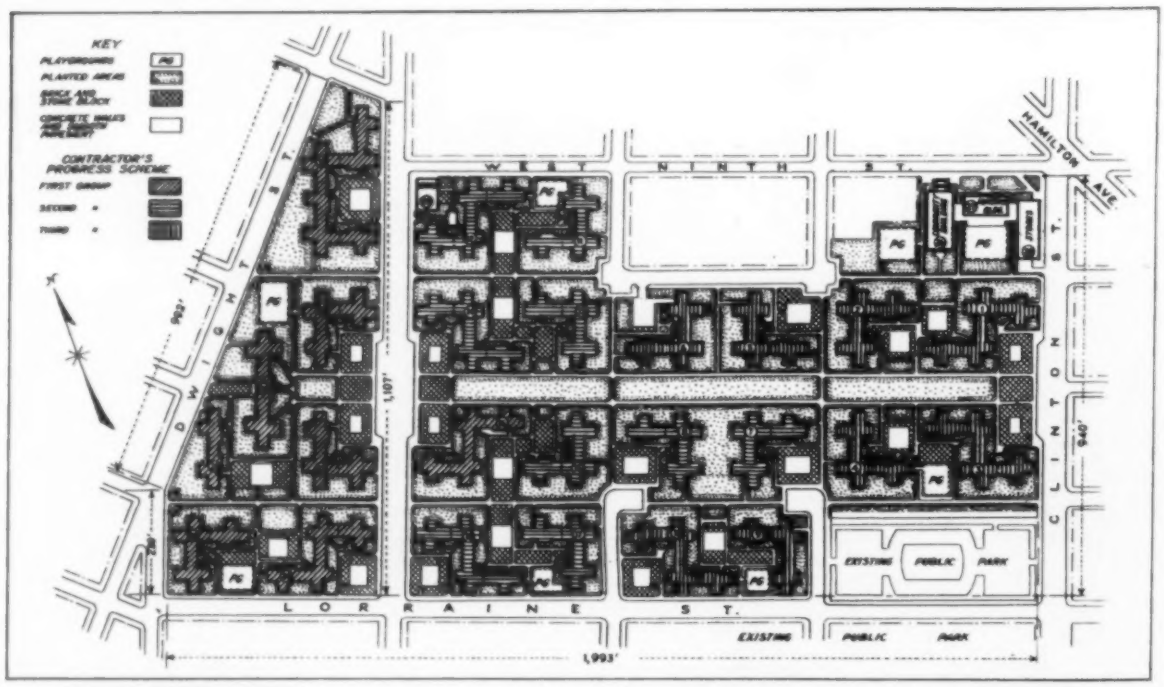
tion of concrete work during the winter. Between December 8, when the vacuum process was introduced on the job, and March 3, the contractor placed concrete on 46 out of 58 working days. Before the vacuum process was put in operation, the job had placed concrete only 2 or 3 days each week.

All tension reinforcement in the slabs and beams of Red Hook Houses is Isteg cold-twisted twin-bar steel, each piece consisting of two rods twisted in a helix, for which the New York City Building Code, adopted in 1937, allows working stresses 50 per cent greater than for ordinary bars of the same grade. This allowance permits a 33 per cent reduction in steel sections and weight.

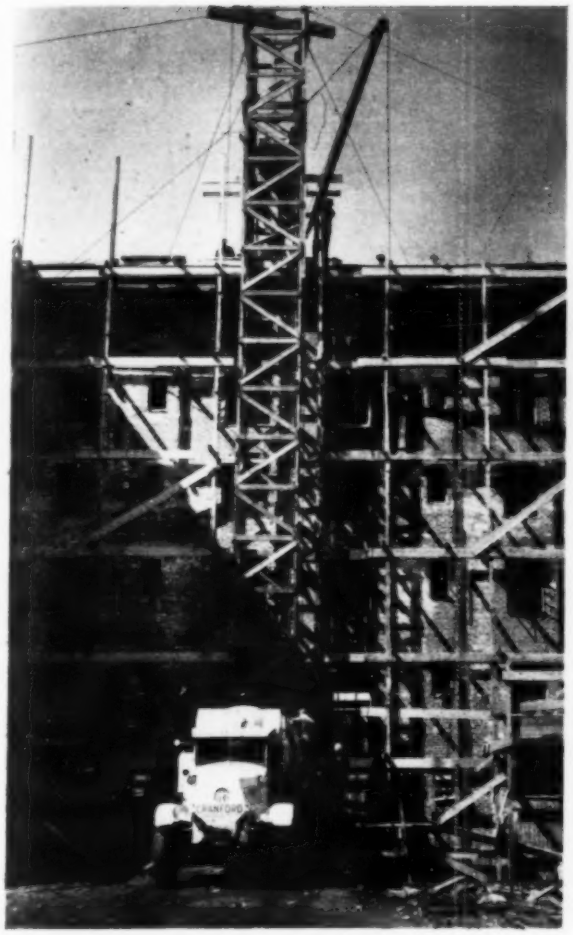
Commercial Standards—Red Hook Houses represent a departure from the superlative standards established by the PWA Housing Division for projects built during recent years under its supervision. By adopting commercial standards for design, materials and working tolerances, without any sacrifice of provisions for sunlight, air, open space, sanitation, comfort and convenience, the New York City Housing Authority in cooperation with the U. S. Housing Authority is erecting 25 six-story elevator buildings of Red Hook Houses, containing 2,500 apartments of 10,500 rooms, at a construction cost of about $850 per room, as compared with a construction cost approaching $1,400 per room for the 1,625 apartments in the four-story walk-up buildings of Williamsburg Houses, Brooklyn, completed by PWA in 1937 and 1938.

Complete cross ventilation for all dwelling units is the only basic planning principle discarded on the present project. All Red Hook apartments, ranging in size from two rooms to five and one-half rooms, have at least two exposures. With the aid of the 3½ per cent annual

New York City Building Code *Reinforcing Steel Working Stresses*	
	Tension, lb. per sq.in.
Bars, structural grade	18,000
Bars, intermediate grade	20,000
Cold-twisted twin bars, structural grade	27,000
Cold-twisted twin bars, intermediate grade	30,000

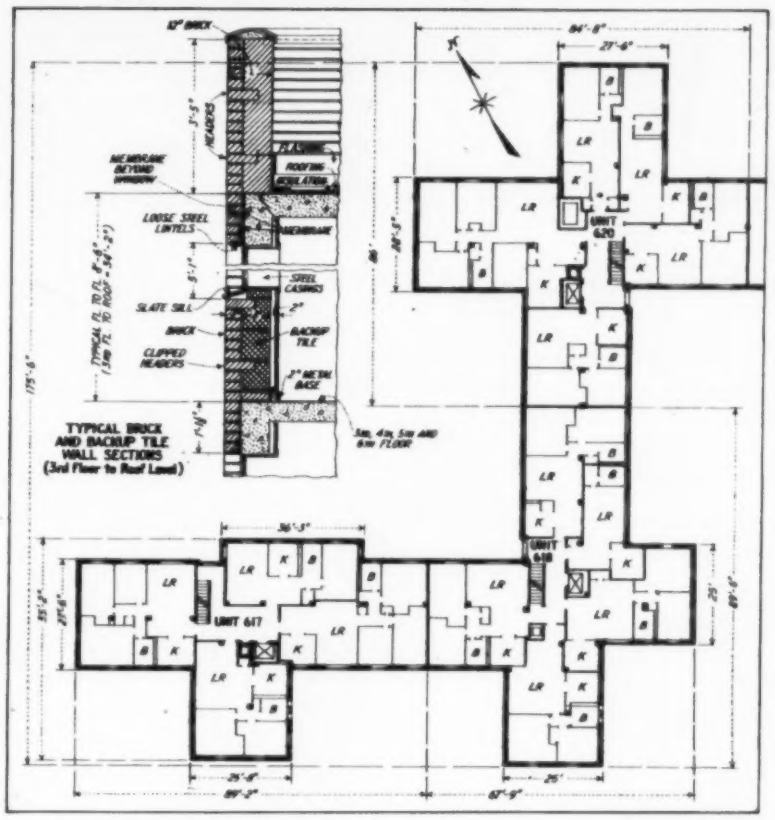


CONTRACTOR'S SYSTEM for progressive construction of three groups of apartment buildings permits concreting of standard girders and slabs in 25 structures with nine sets of forms, figuring 60 to 100 per cent replacement of plywood during process. Girders and slabs from second floor to roof are standard; first floors are special and are poured in advance with three sets of forms. Standard forms are moved to buildings of identical shape where possible. Project makes no provision for garages; excellent public transportation facilities in New York City eliminate need for cars among low-income families.



TRUCK MIXER (left) delivers concrete to hopper at base of elevator tower. Boom on tower leg handles bars and equipment.

SIX-STORY WALL-BEARING BUILDINGS of pleasing, economical design go up rapidly in groups of eight or nine units. Connecting scaffold bridges speed transfer of men and equipment between adjacent buildings.



THREE STANDARD UNITS, 617, 618, and 620, are turned in various directions and combined to form 24 of 25 apartment buildings. One special unit plan is developed for central portion of Building 21. Rooms not marked by letters are bedrooms.

federal subsidy on the total capital cost under the Wagner-Steagall Act, the apartments will rent for about $5 per room per month, plus charges for heat, hot water, gas and electricity, amounting to about $5 per month for each apartment.

Including four community buildings, making a total of 29 buildings in all, structures will occupy 17½ per cent of the total land area of 39¾ acres and slightly less than 23 per cent of a net area of nearly 33 acres, leaving more than 25 acres clear for lawns, walks and play space.

Structural Features—All buildings are fireproof, wall-bearing structures, with reinforced-concrete interior columns and girders and reinforced-concrete one-way slabs, resting on foundations of uncased cast-in-place concrete piles. Foundation walls are 16-in. monolithic concrete up to grade, and 8 in. above grade, with 8-in. brick applied on the outside to the first floor level. With the exception of a single building, the floor plans of all dwelling houses are made up of three standard unit plans. An accompanying sketch shows how these standard units are combined in a building.

Exterior walls are 12-in. solid brick for the two lower stories, and 4 in. brick backed up by 8-in. hollow terra cotta tile for the four upper tiers, with brick header courses every sixth course for all stories. Bearing piers under the girders are solid brick to the top. Parapet walls above the roof are solid brick 12 in. thick.

FOUR MEN pull screeds over vibrated concrete, three working long strikeoff and one handling light follow-up board.

Fire walls separating units in a building are 4-in. hollow gypsum tile, plastered. Interior partitions between apartments are 3-in.-thick solid plaster on steel channels and wire lath; partitions between rooms are the same type, 2 in. thick.

Slabs vary in depth from 5½ to 6½ in. and average about 6 in. Ceiling height is 8 ft. throughout. As an example of the reasonable working tolerances specified and rigidly enforced, variation of ⅜ in. in both floor and ceiling grade is permitted. Windows are Fenestra light-section steel casements built into the masonry walls. Window saddles are slate. Major cost savings were achieved by the designers by omitting all but one closet door in each apartment (substituting curtains on rollers), by eliminating doors and bucks at kitchens, and by omitting elevator stops at the cellar, second, fourth and sixth floors.

High-Strength Reinforcement—Isteg cold-twisted twin-bar reinforcement, produced at the Buffalo plant of the Wickwire-Spencer Steel Co., was substituted for ordinary bar steel in the girders and one-way slabs without any redesigning by the engineers and without changing the number of bars to be handled. Sizes 1 to 8 were

(Continued on page 76)

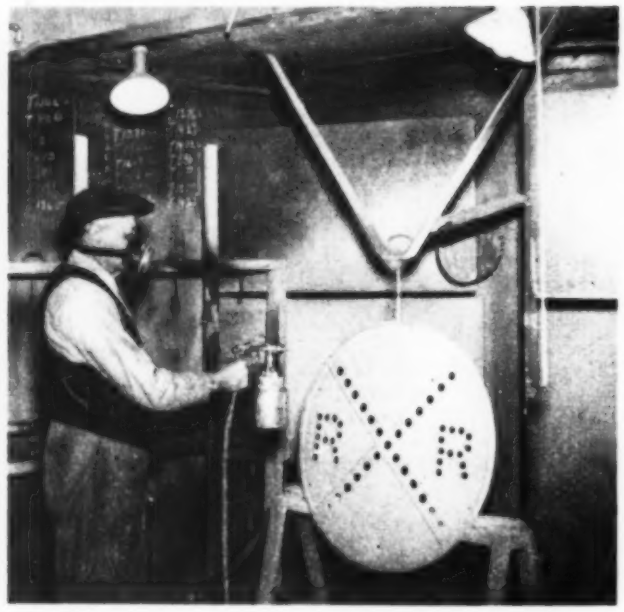
PRONE-PRESSURE METHOD of resuscitation is demonstrated to large first-aid class in District 9, typical of employee groups taking first-aid courses in all ten districts.

Illinois Highway Employees Reap Benefits of Cooperation in

SAFETY WORK

By H. H. HARRISON

Traffic Engineer, State Division of Highways, Springfield, Ill.



RESPIRATOR MASKS protect operators of paint spray apparatus in equipment garage and sign shop.

ONE OF THE BRIGHT SPOTS in the history of accident prevention is the record that has been made by private industry during recent years. Many commercial concerns have succeeded in reducing the frequency of accidents causing injury to employees by as much as 60 per cent as a result of well planned and conducted safety programs. Such activities not only have accomplished the elimination of large compensation losses, but have likewise had the psychological effect of stimulating employees to work with greater efficiency.

Operation of a large system of state highways requires diversified services of many kinds. Many of these services are hazardous in the extreme if employees are not made to realize the risk and the consequences of careless acts. Much of the work is performed on the open highway with only signs and light barricades for protection. In such operations the exposure to errors of motorists is equally as serious as the employees' own mistakes. Hence, workmen must be doubly alert.

Safety Program — Illinois authorities, desiring to benefit by the experience of private industry in reducing compensation claims and in protecting workmen from disabling accidents, directed the Traffic Control and Safety Section of the Division of Highways to undertake such a program. An organization which consists of some 40 engineers, draftsmen, stenographers and clerks is now engaged, among other duties, in conducting this work. To accomplish effective field supervision, a traffic engineer and a safety engineer have

GOGGLES (left) are required equipment for all employees doing work such as pavement breaking, which involves eye hazards.

BULLETIN BOARDS (right) and warning signs in district garages help to keep employees safety-conscious.

been named in each of the ten highway districts. Also cooperating in the program are five specially trained officers of the State Highway Police.

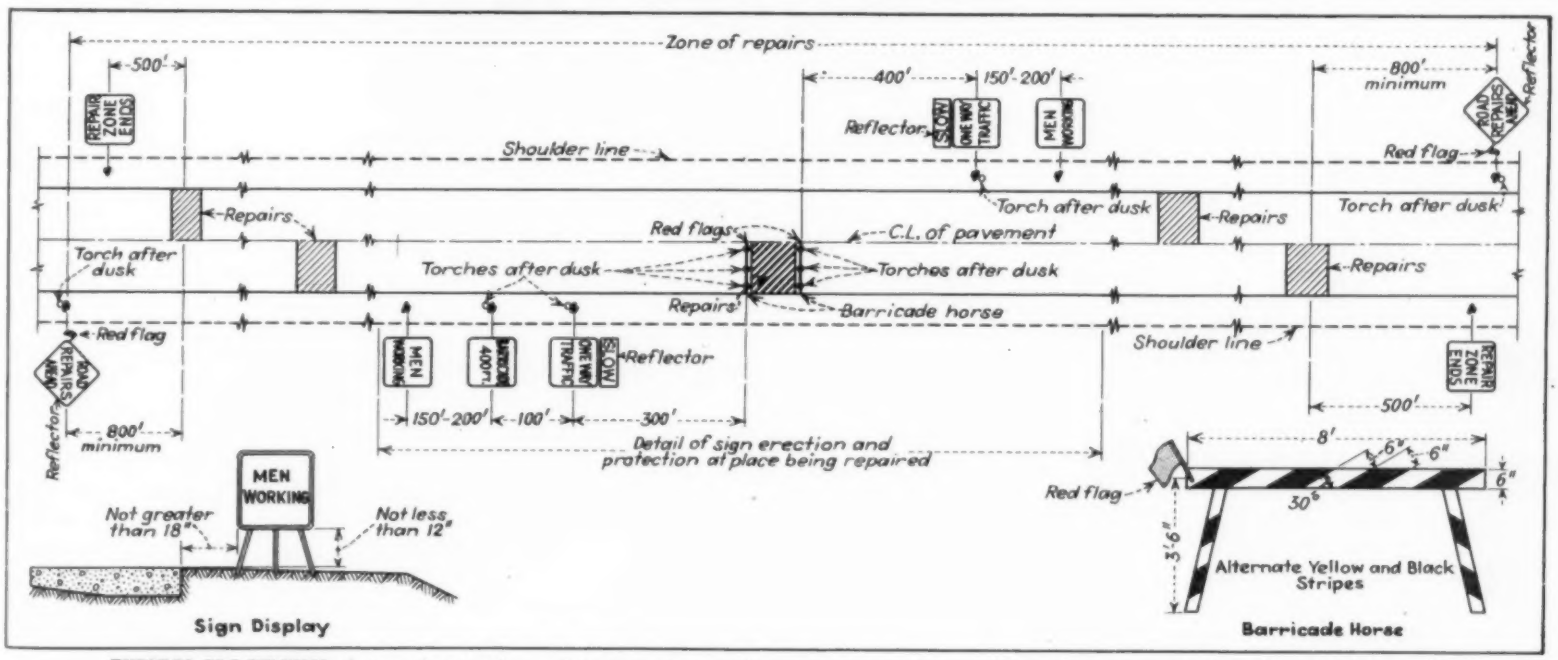
First-Aid Training — One of the major activities undertaken at the beginning was the training of all employees in emergency first-aid treatment of injured persons. The training was undertaken for a dual purpose: First, to afford proper care to motorists injured in traffic accidents and, second, to minimize the effect of injuries resulting to workmen in the performance of their duties. More than 3,000 employees have been given this training. To train new employees and to conduct review classes for those previously trained, more than 40 engineers and police officers have completed the instructor's courses of the American Red Cross or the U. S. Bureau of Mines. In Illinois, the State Department of Mines and Minerals cooperated in the training program by furnishing qualified instructors.

All operators of motor vehicle equipment have been provided with a ten-unit first-aid kit containing bandages, compresses, burn ointment, antiseptics, ammonia inhalants, tourniquets and forceps. In all district shops a kit containing a much more complete list of supplies has been placed. All employees are required to maintain a complete stock of supplies at all times.

Knowledge of the effect of common types of accidents and of the proper methods to be used in caring for the sufferers is vital to any safety program affecting employees. It not only qualifies the employee to administer emergency treatment but also gives him a better realization of accident consequences, with the result that he becomes a safer workman. Reports of many cases where highway employees rendered emergency treatment have shown conclusively that the benefits obtained by such training far overshadow the cost of conducting the course.

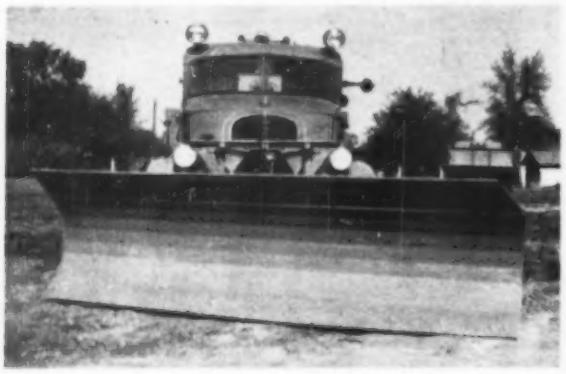
District Safety Councils — As a means of directing the safety program in the field, a safety council was created in each district. The primary purpose of these councils is to familiarize employees with safe working and driving practices. Each council consists of at least ten members chosen from the various employee classifications so that each group of employees has a voice in the program. The district engineer or his first assistant is made an ex-officio member of this group, and either the district traffic engineer or district safety engineer is made the permanent secretary. All members are appointed for a six-month period with their terms of office so staggered that every two months one-third of the membership changes. This plan of rotating the membership gives a greater number

PLACE BEING REPAIRED is protected by horse barricades.



TYPICAL PLACEMENT of signs, barricades and torches at zone of pavement repairs provides adequate protection for motorists and workmen.

VEHICLE INSPECTION TRUCK (left) carries apparatus for testing state-owned vehicles in district garages not equipped with testing devices. Truck also tests privately owned equipment as one phase of Department's state-wide program in traffic safety education. Devices carried by truck include (1) four-wheel brake tester, (2) headlight tester to check aim and intensity of beams, and (3) wheel alignment tester. Inspectors also make visual examination of brakes, mirror, glass, tires and other elements affecting safety.



SPECIAL HEADLAMPS and lights to warn passing traffic are mounted on truck equipped with moldboard snow-plow attachment.

FOUR-WHEEL BRAKE TESTER in district highway garage tests brakes of state-owned car.

of employees an opportunity of participating in the administration of the council. The secretary is made responsible for calling all meetings and directs all its activities.

Employee Examinations—A Safety Code containing rules covering transportation, shops and garages, the use of signs and signals, field maintenance operations and first aid was adopted during 1936 and is now in general effect. The code is published in a pocket-size booklet. All employees must familiarize themselves with it. They are required to take written examinations from time to time to keep the code alive in their minds.

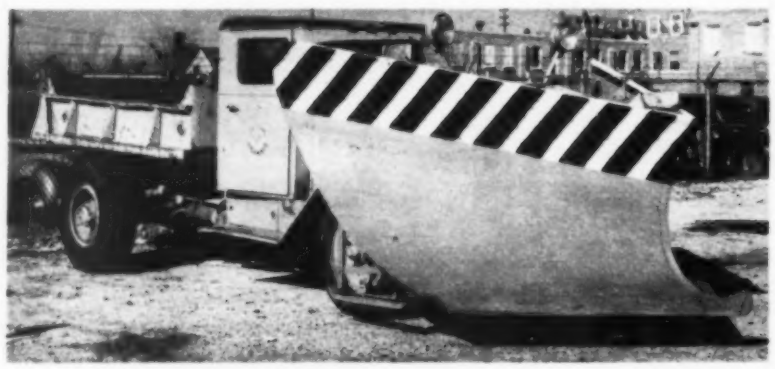
Accident Investigation—Once each month the district safety council meets as a Board of Review to study all reported Safety Code violations or employee accidents. Each case is prepared and presented to the board by the district safety engineer, who prior to the meeting has completed a detailed study of the violation or cause of the accident. If, in the opinion of the safety engineer, the gravity of the case warrants, the employee is summoned to appear to state his side of the case. In addition to recommending disciplinary action the board studies ways and means of avoiding like accidents in the future. Complete reports are prepared of these meetings by the secretary, and the reports are published together with other safety material in a District Safety News Letter which goes to all employees.

During 1937 there were 764 Board of Review cases heard by the ten district safety councils. Of these cases, 546 were personal injury accidents, and 218 were motor vehicle accidents involving state-owned equipment. In the first nine months of 1938, 424 personal injury and 190 motor vehicle accident cases were heard by District Boards of Review.

Employee Meetings — At regular intervals group meetings of employees are held for the purpose of discussing safe working practices, motor vehicle laws, first aid and principal accident causes. These meetings are carried on by the employees in the ranks with the guidance of the safety engineer.

Bulletin boards, maintained in all district shops and garages, carry posters and other material dealing with specific safety problems. To maintain interest in the program, this material is changed at regular intervals. Other material such as safety slogans on windshield stickers, commercial safety literature, and the Department Safety Bulletin are distributed to employees.

Safety Devices — Equipment and safety devices are purchased to safeguard employees. In addition to first-aid kits, these purchases have included goggles for all those engaged in work where there is likelihood of eye injuries, paint spray masks, guards for shop equipment, signal devices, fog lights, special spot lights and defrosters for motor vehicles. Each shop is equipped with vehicle-inspection tools and devices to keep all state-owned motor vehicles in safe condition. Such equipment consits of wheel aligners, brake testers and photo-electric headlight testers for checking both aim and intensity. Employees are instructed to report at once any defective tools or equipment and to discontinue their use until the defects are corrected.



V-TYPE SNOW-PLOW ATTACHMENT carries its own set of headlamps. Truck cab is equipped with triple red warning lights, and plow is painted in black and white bars for greater visibility.

Accident Records — A complete record is maintained of all personal injury accidents which require the services of a physician. Once a month these accidents are tabulated by classification of employee, type and cause of accident. The records form the basis of a selective accident prevention program. As a result of promotional efforts, employees now are reporting accidents which in previous years were not considered. For this reason it is impossible to gage the results of the program on the basis of accident frequency rates. Longer term experience will be necessary to permit analysis of the effect of the program in actual accident reduction.

Department authorities are satisfied with the accomplishments realized to date and are convinced that the program is sound. Efforts will be continued to the end that all employees may fully appreciate their responsibility to the motoring public and to their fellow workmen.

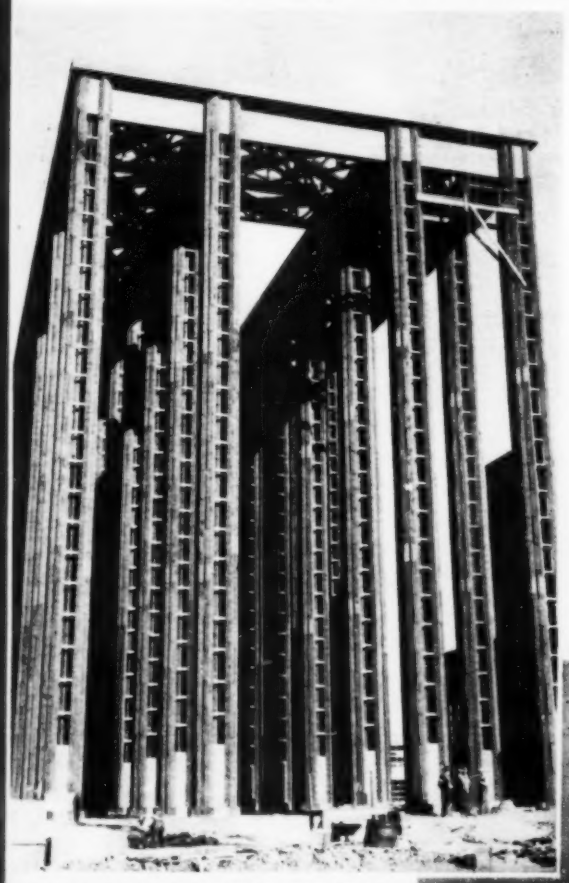
JOB ODDITIES

A MONTHLY PAGE OF

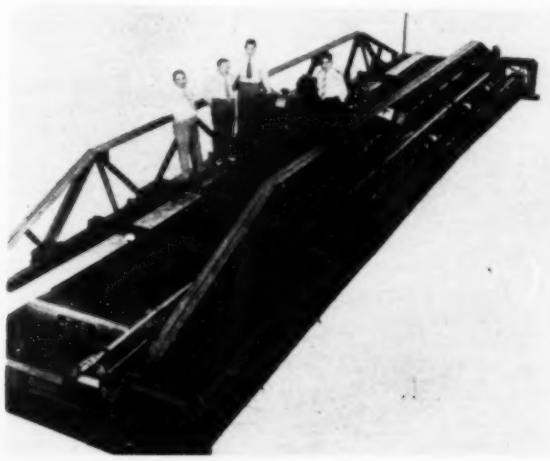
Unusual Features of Construction

Wide World Photo

HAND-CARVED MINIATURE of Delaware River bridge in Philadelphia, Pa., represents 14,900 hr. of work by Dominick de Gregoria. Made of balsa wood with aid of knives and razor blades, the bridge model weighs 601 lb. and stands 22 in. high.



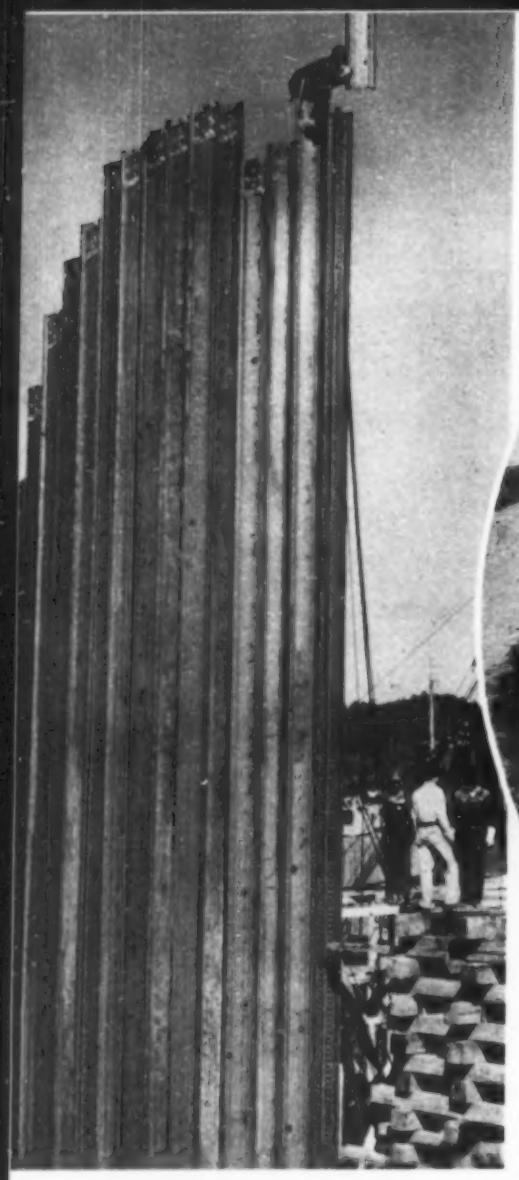
A COLUMN FOR EACH STATE. Colonnade of Federal Exhibit Building at Golden Gate International Exposition, San Francisco, comprises 48 columns, each 104 ft. high, consisting of 3-in. hot-bed process plywood webs arranged in sheets so that each sheet is at right angles to the sheet below. Douglas fir posts at each of four outside edges of columns are held by split-ring timber connectors, as described in the January issue of this journal, p. 52.



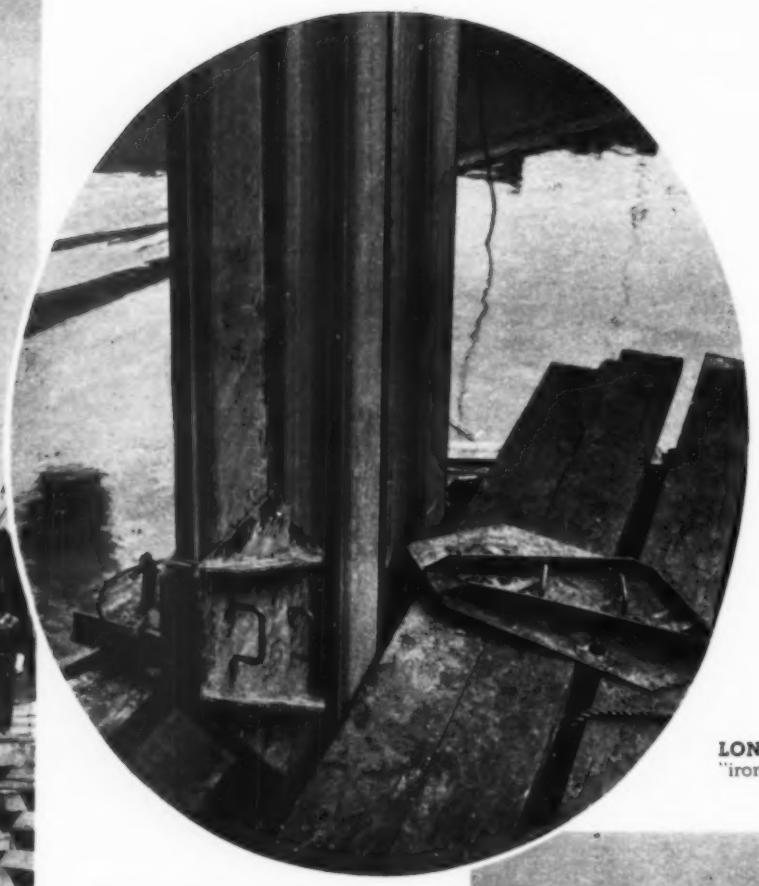
PRIZE PHOTO (above) shows construction scene in which Caterpillar tractor with LeTourneau bulldozer, owned by Graham Bros., of Los Angeles, Calif., pushes sand and gravel downhill to belt conveyor which delivers to crushing and screening plant. Picture by Marvin Beeker of Gabriel Moulin Studio, San Francisco, received medal at eighteenth annual exhibition of advertising art by Art Directors Club.

LARGEST FINISHING MACHINE (left) for concrete or bituminous roads weighs 18 tons and is designed for widths of from 40 to 52 ft. Powered by two Hercules gasoline engines (one for traction and the other for mechanical operation) and equipped with five electric vibrator units, the machine was recently shipped to Russia by the Flexible Road Joint Machine Co., of Warren, Ohio. It will ride on special Heltzel steel road forms.

CONSTRUCTION "HOUSE BOAT". As part of its marine equipment for sinking pneumatic caissons for the Raritan River bridge at Perth Amboy, N. J., the Peter F. Connolly Co. and H. J. Deutschbein Co., Inc., contractors, made an unusual application of a standard 68x26x10-ft. Blaw-Knox galvanized steel building, housing compressors and recompression room for divers, by mounting it on a barge.



HAZARDOUS PERCH on top of sheetpiling must be occupied by worker to engage interlock in ordinary way.



"IRON MONKEY" (above) consisting of pair of steel plates attached to bottom of pile, effects interlock of steel pile sections without subjecting workers to danger of accidents. Other set of plates alongside is a left-hand assembly for use on next pile. The two sets of plates are alternated in use.

"IRON MONKEY"

Engages Sheetpile Interlocks

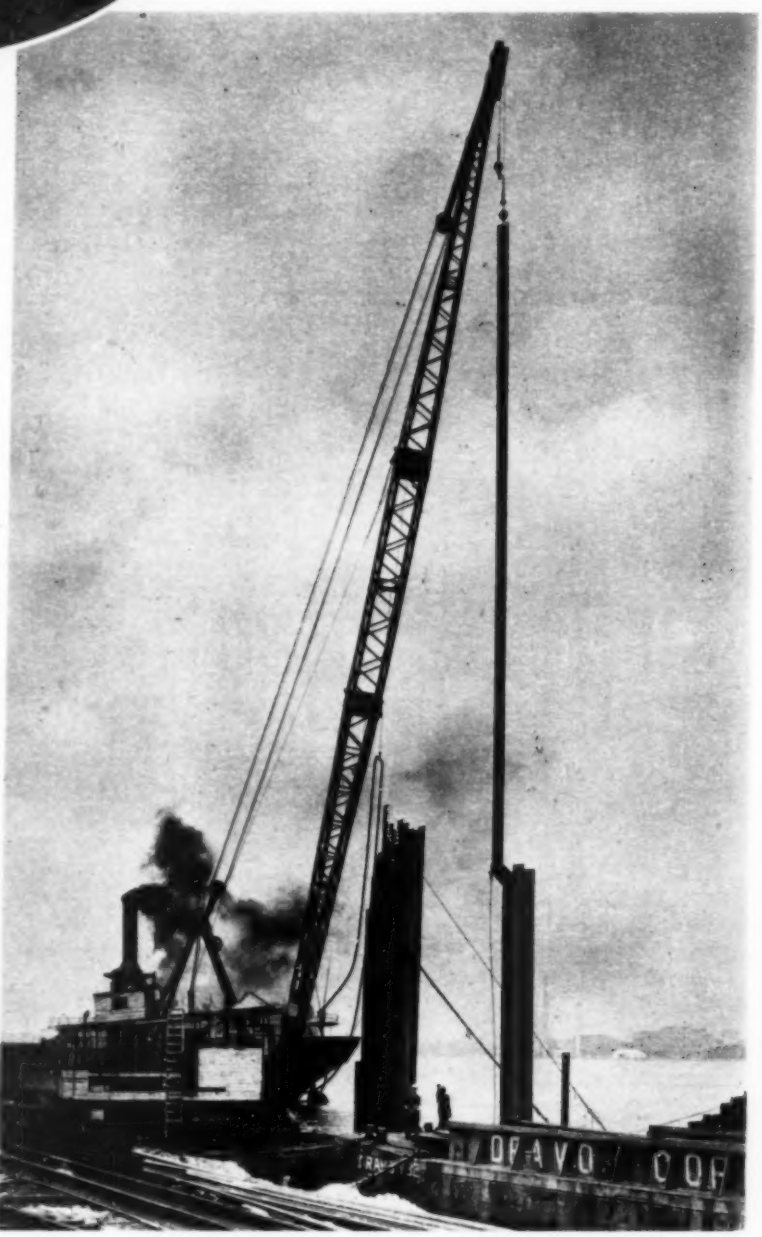
IN THE CONSTRUCTION of cellular steel cofferdams the assembling of the individual sheets requires raising each sheet sufficiently high so that it can be engaged in the interlock at the upper end of the previously set piling. It has for many years been customary to have a man ("pile monkey") perched in a precarious position at the top of the previously set piling and he is required to restrain and guide the incoming pile into the interlock. This is frequently a very hazardous operation, because on a windy day it is difficult for a workman to exert the necessary force to restrain the pile and at the same time to retain his balance at the top of the piling.

On a recent job Dravo Corp., of Pittsburgh, Pa., drove a series of steel sheetpile cells where the work was exposed to very heavy winds and dense fogs. The steel sheetpile ranged in lengths from 75 to 93 ft. Efforts were made to overcome the problem of interlocking or entering the pile so that this operation could proceed regardless of weather conditions. The result was a very simple device (patented), consisting of two steel plates of special shape and dimensions, which has eliminated the hazardous operation at the top of the piling and transferred the operation to a very simple problem of assembly at ground level. Dravo workmen called this the "iron monkey", taking its name from the job performed.

Each plate is sufficiently light so that it can be handled by one man. One of the plates is equipped with two pins welded to the plate and arranged so that one of the pins extends through the handling hole at the bottom of the pile. The other plate is brought up on the other side of the pile and slips over the projecting pins; steel wedges are dropped through slots in the pins to hold the two plates securely to the bottom of the pile. The plates have suitable welded flanges to fit around the pile and hold them in a definite relationship to the pile. In the process of as-

(Continued on page 82)

LONG PILE. (below) equipped at bottom with "iron monkey", is raised for assembly and interlock by whirler crane.



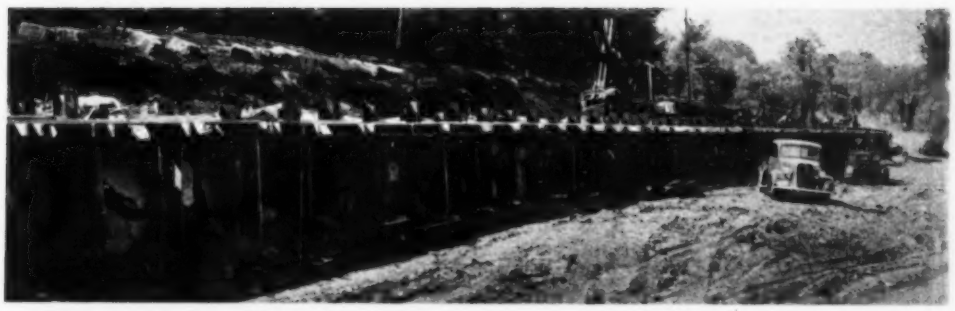
STEEL-PILE STRUCTURES

Protect Ohio Highways Against Slides and Floods

STEEL H-SECTION COLUMNS anchored in rock furnish the backbone of retaining structures built in the Marietta division of the Ohio Department of Highways to stop slides on sidehill locations and protect vulnerable sections of riverbank road against floods. Three structures of two types designed to provide the kind of protection needed have been built by an Ohio contractor, the Turner Construction Co., of Logan, on projects financed with federal emergency relief funds. Accompanying photographs show construction operations on these projects.

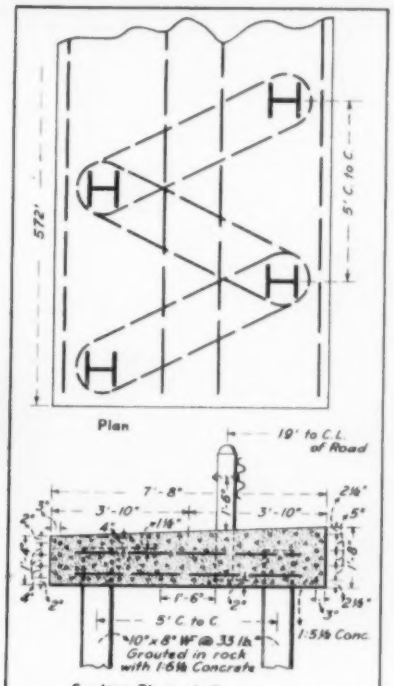
Steel-Pile Bulkhead — On a section of the Ohio River road (State Route 7) about 10 mi. west of Marietta, where a slide had been giving trouble for years, the contractor in June completed 572 ft. of bulkhead on the lower side of the highway. This structure, details of which are shown in an accompanying sketch, consists of two lines of wide-flange steel piles set in concrete-filled holes drilled into the underlying rock, with heavy derrick-placed stone keyed into the space between the pile rows. Tying the piles into a unit at the top is a reinforced-concrete cap constructed flush with the roadway shoulder. Piles in the two rows are staggered on

(Continued on page 84)

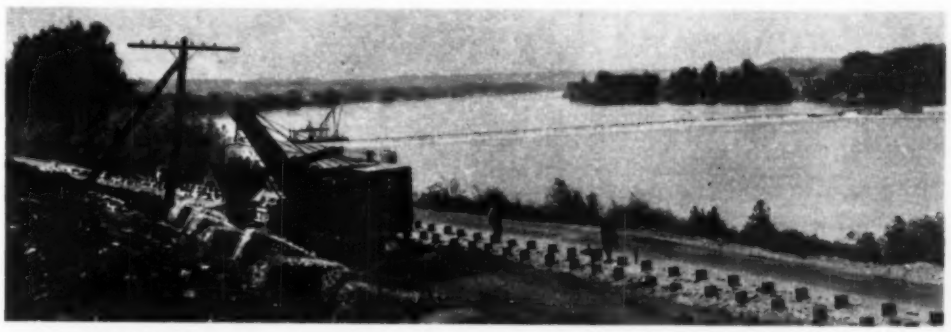


AFTER SETTING DERRICK STONE between two rows of H-piles, contractor starts erection of forms for concrete cap.

FOR PLACING CONCRETE around H-piles in drilled holes under water, contractor uses single-line cylindrical bucket (indicated by arrow) which remains closed until it touches bottom. Dogs then slide down shaft and grasp cap, as shown here, to raise cylinder and let concrete escape.

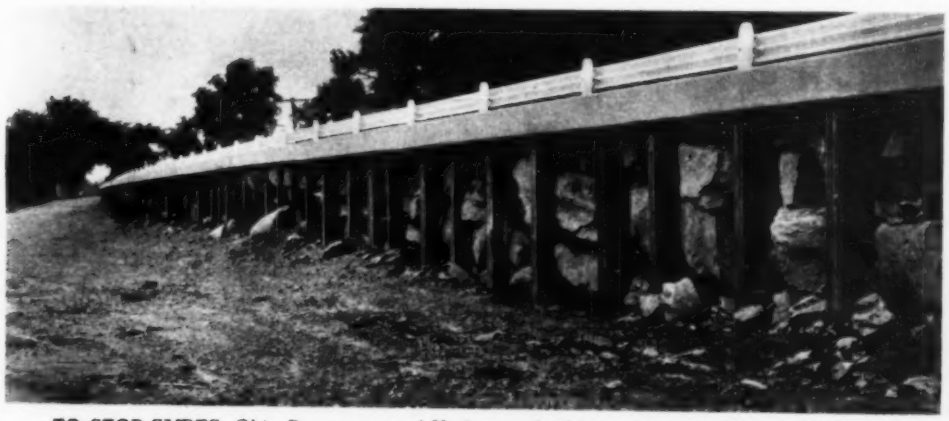


STEEL-PILE BULKHEAD incorporating two rows of H-columns anchored in rock carries reinforced-concrete cap of 18-in. average thickness.



STEEL H-PILES project above derrick stone keyed between two pile rows. In background appears Ohio River dam 18.

FOR FLOOD-PROTECTION STRUCTURE along Muskingum River, churn drill cuts holes 12 ft. into rock. Steel H-piles 32 ft. long are set in holes and bottom 12 ft. in rock is concreted.

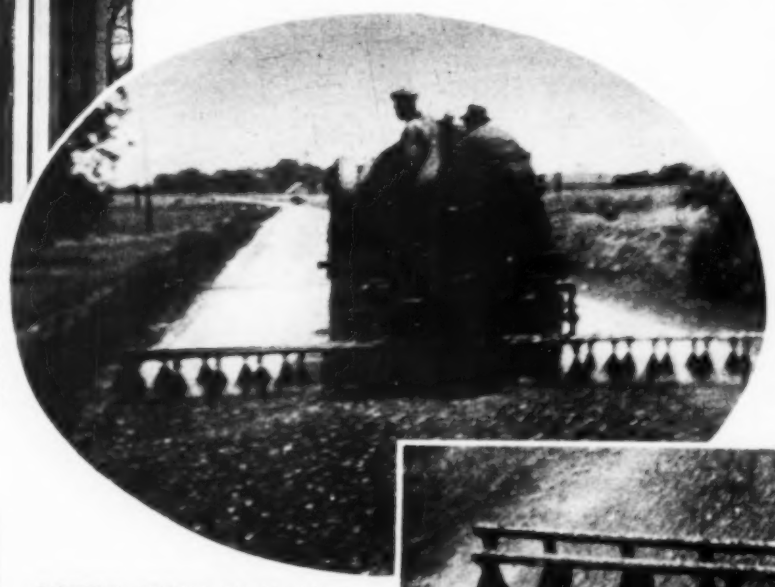


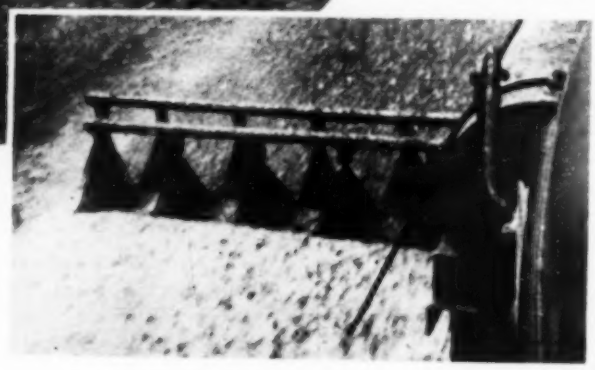
TO STOP SLIDES, Ohio Department of Highways builds steel-pile bulkhead filled with derrick stone and surmounted by reinforced-concrete cap and highway guard rail.

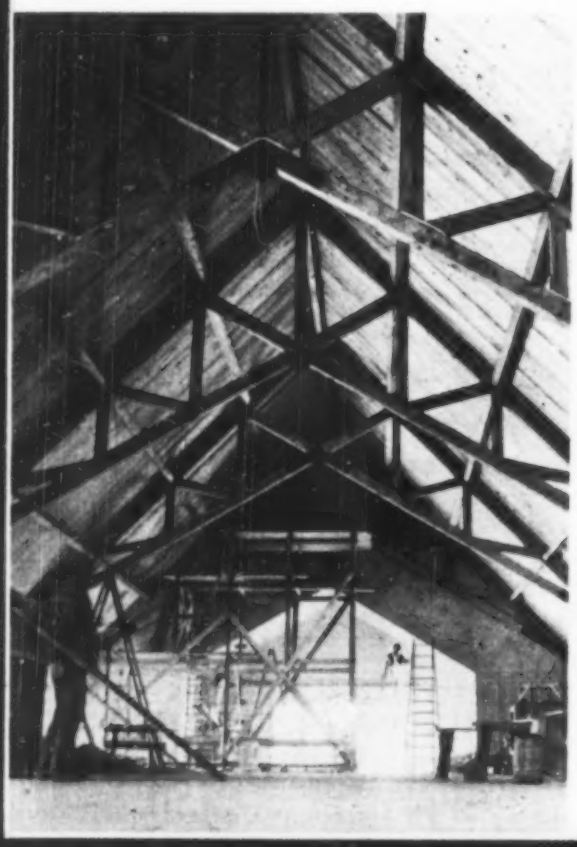
How They Did It...

WEIGHT SAVING in 100-ft. boom (with 20-ft. jib) of 18½-ton capacity crawler crane on construction of elevated highway in Borough of Queens, New York, is effected by use of Mayari R high-strength alloy steel, product of Bethlehem Steel Co. Actual weight of boom is 9,790 lb., as compared with estimated 12,000 lb. for ordinary carbon steel boom of same capacity, resulting in 20 per cent saving in weight. Alloy steel has ultimate tensile strength of 70,000 lb. per square inch and minimum yield point of 50,000 lb.

"FISHING" FOR DRILL BIT (left), detached from rod or broken, is aided by illuminating bottom of hole with a beam of sunlight reflected by small mirror. Using this device on their Lincoln tunnel approach job in New Jersey, B. Perini & Sons, Inc., contractors, saved a number of drill holes that otherwise would have had to be abandoned.



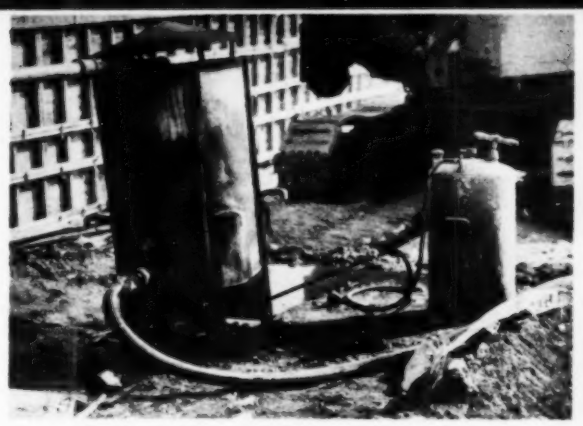




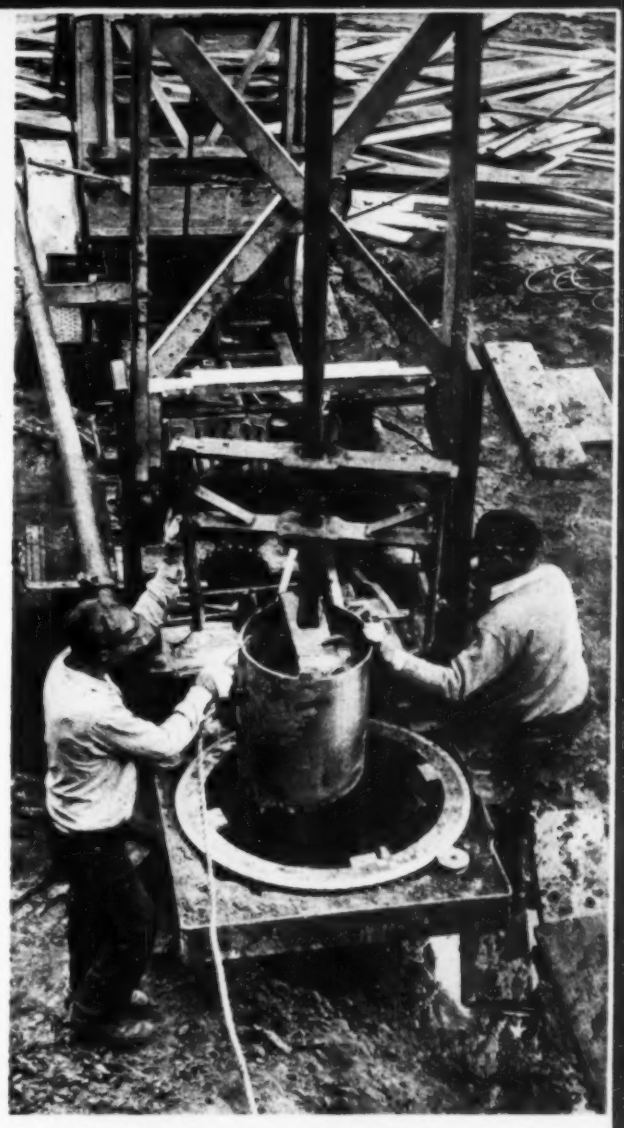
DOUBLE SPRAY BARS (above and right) with staggered nozzles (patented mechanism on distributor of Sam E. Finley, Atlanta, Ga., spraying cutback asphalt at about 135 deg. on seal coat of bituminous surfacing near Chappells, Newberry County, S. C.) give uniform spread and obviate necessity of stopping distributor before end of shot if one nozzle clogs, as overlapping of adjacent nozzles takes care of situation. Unit construction of double bars saves time in attachment and removal. Photos from FRED C. BISCHOFF, South Carolina Highway Department, Clinton, S. C.

SCISSORS TYPE (left) of wood truss, fabricated with aid of timber connectors, forms support for roof of main dining hall of Ballantine's Inn at New York World's Fair, 1939, which was officially opened to the public April 30.

KEROSENE HEATER (right) raises temperature of mixing water for concreting Brooklyn four-barrel sewer taking 11½ to 12 cu.yd. of concrete per linear foot of structure. P. Tomasetti Contracting Corp., Brooklyn, N. Y., is contractor on project for Borough Bureau of Sewers.



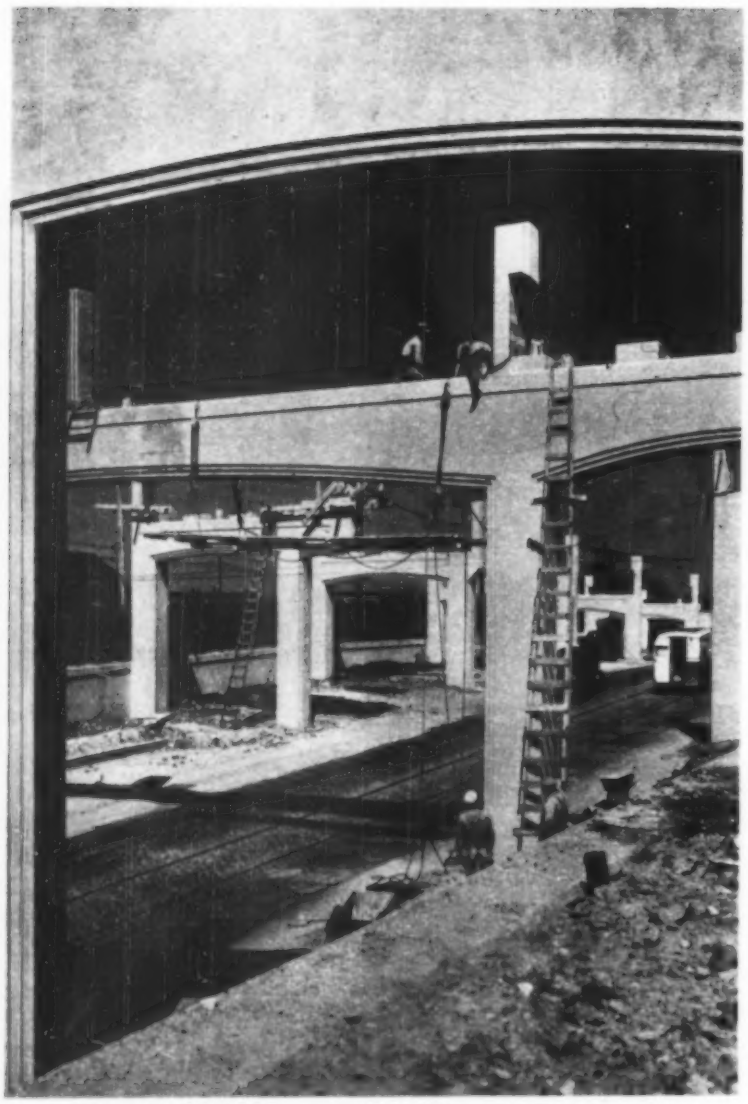
MOBILE DRILLING OUTFIT (left) is created by Clyde W. Wood, California contractor, by mounting on front end of Allis-Chalmers tractor Ingersoll-Rand compressor and drill for use on highway construction through Cuehenga Pass north of Hollywood, Calif. Mounted on hinged frame drill is readily swung into vertical position for putting down blast holes.



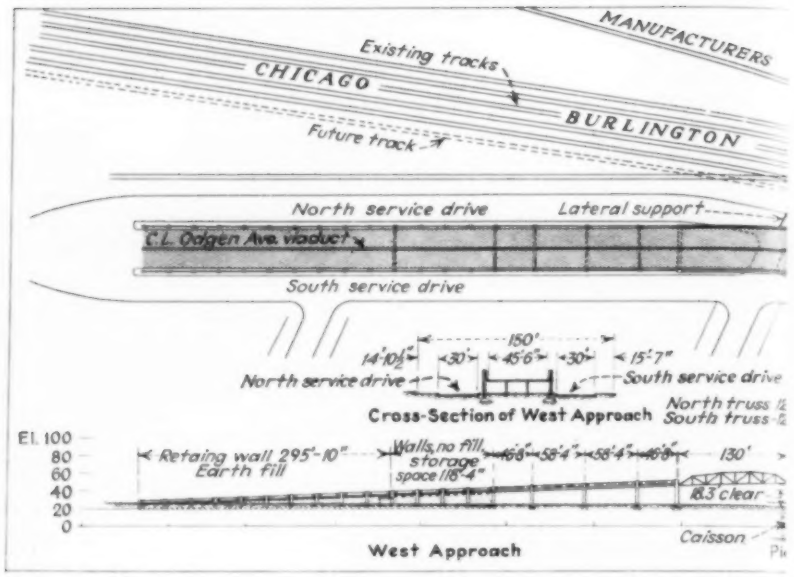
TRUCK-POWERED CAISSON DIGGER suspended from well-drill derrick at rear of chassis utilizes square shaft passing through square holes of welded double yoke. Yoke carries arms which are hooked to revolving circle, mounted in cantilever bracket and rotated by take-off from truck's driving mechanism. Rotating circle turns caisson-digging bucket when bucket is lowered to bottom of hole. When filled, bucket is raised and swung clear for dumping. After digging to desired depth, caisson bucket is removed, and elbow-jointed cutting head is substituted to excavate bell bottom.

ASPHALT-PROCESSED SOIL ROAD (below) at Akron, Ohio, is mixed by C. A. Myers & Son, Akron, with Jaeger self-propelled triple-pugmill mixing plant. After rooting original road to depth of 10 in., harrowing material and adding gravel or clay where needed to produce uniform gravel content of 40 per cent, contractor uses mixing machine to pick up material in two 10-ft. windrows and mix it at speed of about 6 ft. per minute with water and emulsion, latter being added from tractor-drawn tank wagon at rate of about 25 gal. per cubic yard of loose material. Each 10-ft. windrow contains about 0.8 cu.yd. of loose material per linear foot. Two operators at front keep machine on grade, and operator at rear controls proportions of mixture, his judgment on water content helping to obtain soupy consistency which is almost self-leveling. Water truck fills tank on mixer as needed. Spots of emulsion appear on mixed windrow in foreground. After mixing, road is left to dry out, and at proper time sheepsfoot roller aids in compacting mass to 6-in. completed depth, later crowned by blade. Triple seal coat of emulsion and fine slag is placed on base, to be followed by finish course this spring.—Photos and data from HERBERT B. WOODLING, assistant engineer, Highway Department, City of Akron, Ohio.

BATCH TRUCKS, holding four charges, deliver bulk cement and aggregates from central batching plants to mixers on line of Colorado River aqueduct project of Metropolitan Water District of Southern California. Bulk cement is carried in individual rectangular containers attached to swinging gates separating batch compartments of truck body.



CONCRETE FINISHERS rub exposed surfaces of east approach bent. In background are bents of north ramp.



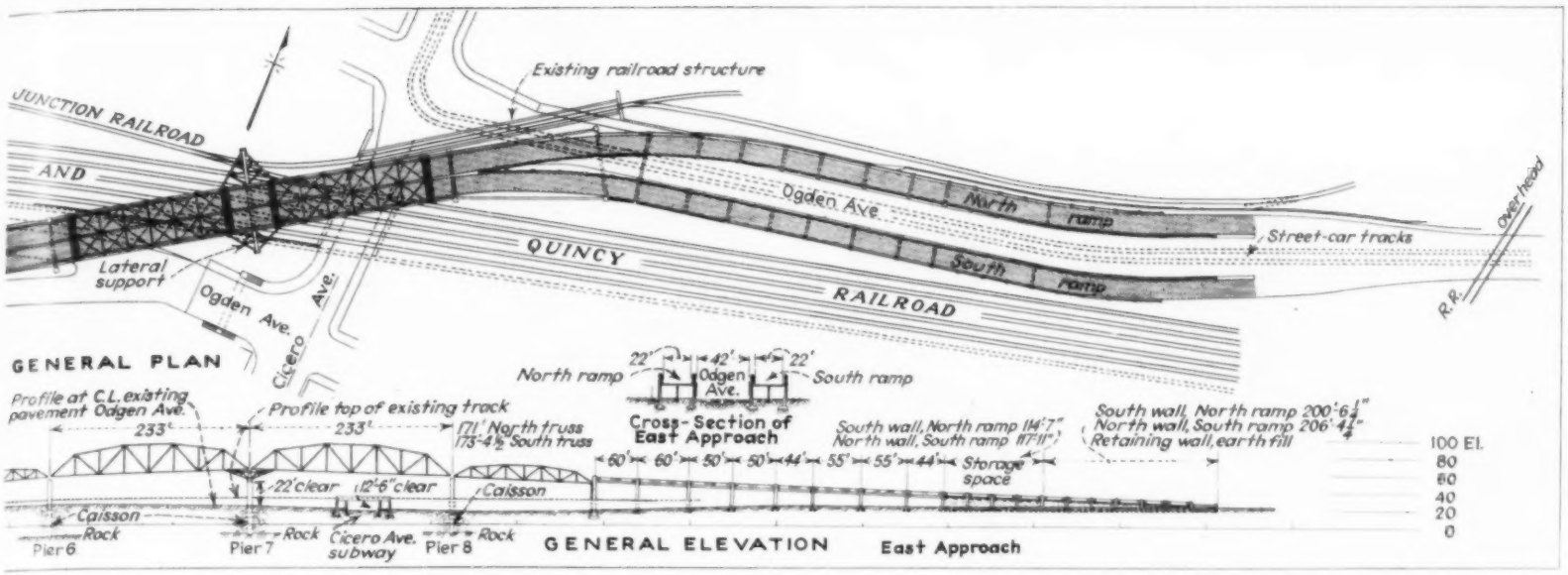
LONG VIADUCT

Carries Chicago Artery Across Railroad and Underpass

EAST APPROACH to viaduct consists of ramps on two sides of existing Ogden Ave. Ramp roadways will converge into divided-lane highway on truss span to be erected between two nearest bents. Cicero Ave. passes through subway in foreground.

AT A COST OF $750,000, the Illinois Division of Highways is lifting Ogden Ave. out of the neck of a dangerous traffic bottleneck in Cicero, Chicago suburb, and is putting it on a modern viaduct, nearly ½ mi. long, crossing above the tracks of the Chicago, Burlington & Quincy main line. Concrete piers, bents and approach structures have been completed by the Thomas McQueen Co., Forest Park, Ill., under a $165,000 contract, and the Strobel Construction Co., Chicago, now is erecting 2,000 tons of structural steel fabricated by the American Bridge Co. On its substructure contract, efficient organization and energetic prosecution of the work enabled the McQueen Co. to finish this part of the project in a little more than half of the allotted time of 230 working days.

Subway Bottleneck — As indicated by the accompanying general plan, Ogden Ave. traffic now has to make a double turn to duck under the Burlington tracks by way of the Cicero Ave. subway, cutting across the traffic streams on Cicero Ave. and, in addition, dodging street cars at the



LONG VIADUCT will carry through traffic on Ogden Ave. across C.B.&Q. (Burlington) main line tracks in Cicero, Ill., avoiding present reverse turn necessary in passing under railroad by way of Cicero Ave. subway. Five through truss spans of bridge are flanked by continuous rolled girder spans connecting with concrete approaches. Viaduct is to be opened to traffic early in 1939.

turn on the north side of the railroad. Ogden Ave. is the main southwest outlet from the Loop and carries the traffic of U. S. 34 and U. S. 66. Cicero Av. is an important highway link in State Route 50. Congestion and commingling of traffic at the subway are the cause of prolonged delays and frequent accidents.

Viaduct — A large measure of relief for the bad traffic situation at this intersection is promised by the viaduct, scheduled for completion early in 1939. Principal features of the viaduct are revealed in the accompanying drawing. Concrete approaches at both ends take through traffic off Ogden Ave. and carry it up moderate grades to a series of continuous rolled steel girder spans connecting with the five main through-truss spans of the bridge. At the east end, the ramps are separated, with an individual ramp for one-way traffic at each side of the existing Ogden Ave. A single approach ramp with divided roadways serves traffic at the west end of the viaduct, where service drives for local traffic are provided on both sides of the approach.

Two 233-ft. through truss spans carry divided 22-ft. roadways of the viaduct across the Burlington tracks on a sharp skew. These spans meet at Pier 7, directly over the railroad tracks. Presence of the tracks makes it necessary to use wide spacing of the two pier columns and to support the truss spans on two cross girders 116 ft. long, weighing 80 tons each. At both ends, the long cross girders are braced laterally from the truss spans.

At pier 5, the north column is similarly offset to provide clearance for a service drive, and lateral supports are provided for the north portion of the cross girders. Both at this pier, and at pier 7, temporary anchorage bolts to hold the long cross girders during erection of the truss spans were incased in the concrete columns by the substructure contractor. In the two columns of pier 7, the contractor furthermore incased horizontal steel channels and provided bracket arms to support the girders laterally after they had been set on the bridge shoes.

Eight caisson piers under the truss spans go to rock; all the remaining piers rest on concrete spread footings

TYPICAL CONCRETING SET-UP utilizes 27E paver and crawler crane handling 1-yd. bucket. Plant is here placing concrete in retaining-wall forms at northeast corner of Ogden and Cicero Aves.

CLAMSHELL BUCKET (right) on extended shovel boom excavates for caisson close to railroad track.

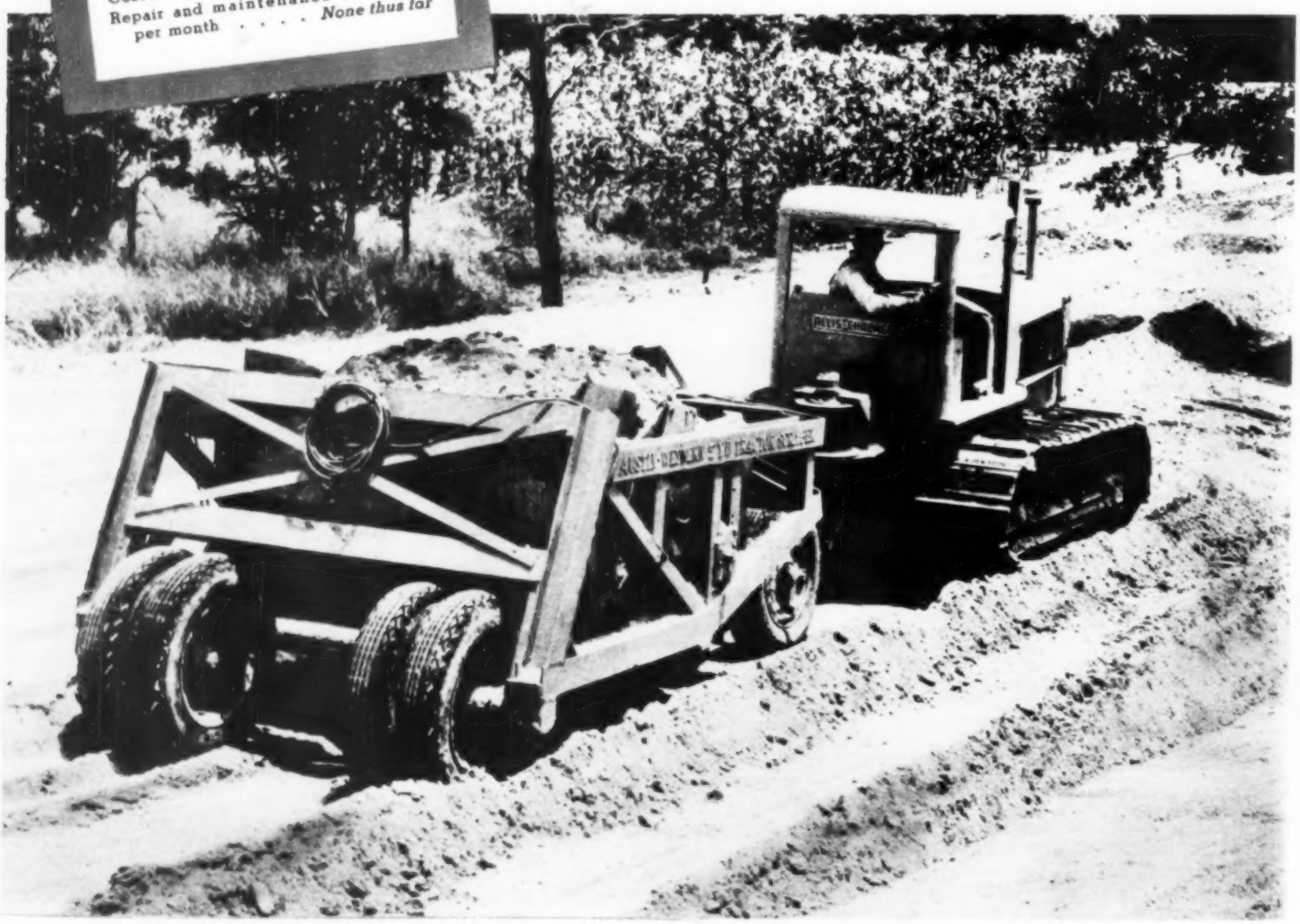
"JobTest"

● Accurate records on scraper performance in all parts of the country pile up evidence that A-W 5, 6, and 8-yard Tractor Scrapers load more dirt per tractor horsepower... dump and spread with greater speed and accuracy ... than any other scraper of the same capacity. Bit can be raised or lowered with trigger-quick accuracy. Pan fills rapidly and cutting edge is always steady because rear wheels track inside of bit on smoother ground. Side sway on slopes or rough terrain is minimized and draft lightened because weight is distributed over six tires. Time is saved by the ability of these scrapers to handle capacity loads in tough going ... and to dump near the edge of a sharp drop without stopping or backing up. Write for complete details on A-W Scraper "job tested" advantages and money saving performance records on your type of work and soil.

"THE ANSWER TO A ROAD CONSTRUCTOR'S DREAM"

Says J. P. McKee, Commissioner of District No. 2, Leroy, Ala. He adds: "Since purchasing the A-W 5-yd. Scraper I have found that I have been able to move more yards of dirt per day than by any other method ... with a lowering of operating expenses. These operating figures prove it:

Average length of haul—1 way . . . . . *feet*	500
Number of hours operated each day . . . . . *hours*	8
Number of trips per day . . .	80
Time per trip . . . . *minutes*	6
Total cubic yards per day . . .	400
Kind of tractor used for power	T-40
Amount of fuel used per day . . . . . *gallons*	15
Cost of fuel per gallon . *cents*	8½
Repair and maintenance cost per month	*None thus far*



EVIDENCE PROVES A-W SCRAPER SUPERIORITY

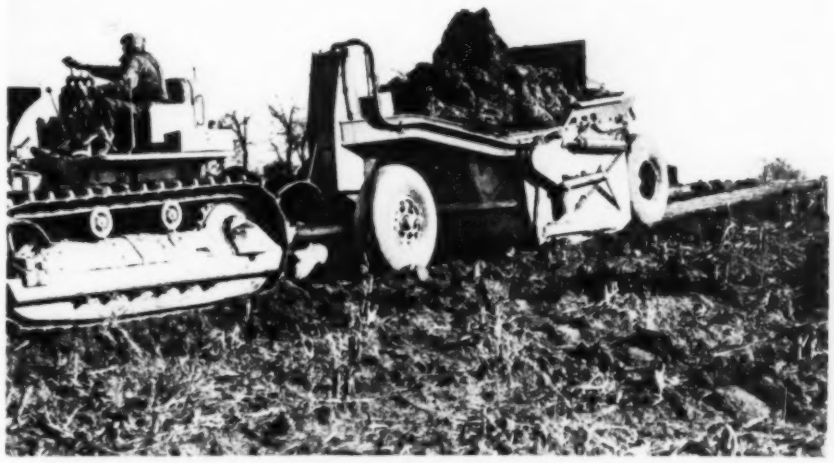
↑ When sharp sloping bit of an A-W Tractor Scraper bites into the surface, the material "boils" back onto a *level pan* that offers no resistance to fast loading. Bit cuts a smooth, firm path for rear wheels which results in more accurate digging.

• • •

← The fast loading bit, the simple cable control and the short turning radius combine to make A-W 5, 6 and 8-yard Tractor Scrapers especially suited for shaping banks and ditches, for leveling airports and golf courses, for stripping overburden at mines, quarries and pits, for terracing, etc.

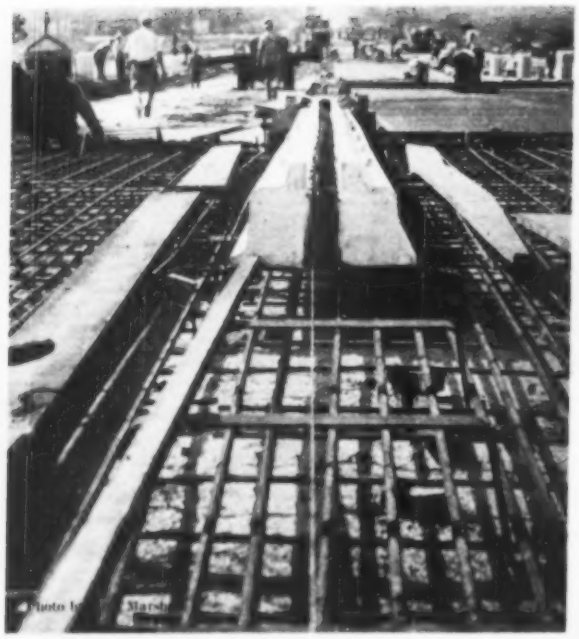
Without losing valuable time to back up, A-W Tractor Scrapers keep moving as they dump and spread the load, without the aid of a bulldozer or grader. ↓

The A-W 12-Yard Scraper is a powerful, big yardage tool. Because it develops its own hydraulic power to raise and shut front gate, raise pan and push out its load, there is no lag in tractor speed at any time. Heaping loads and maximum output are the rule when this fast operating giant is on the job. ↓

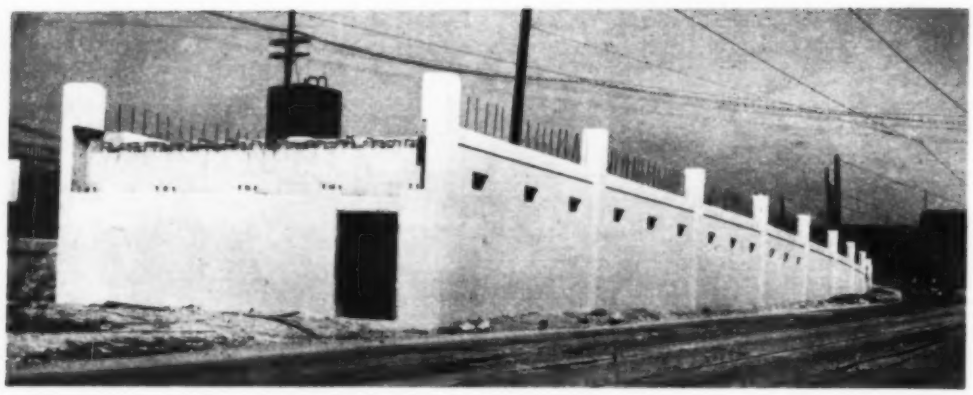


The AUSTIN-WESTERN ROAD MACHINERY CO.

AURORA • ILLINOIS

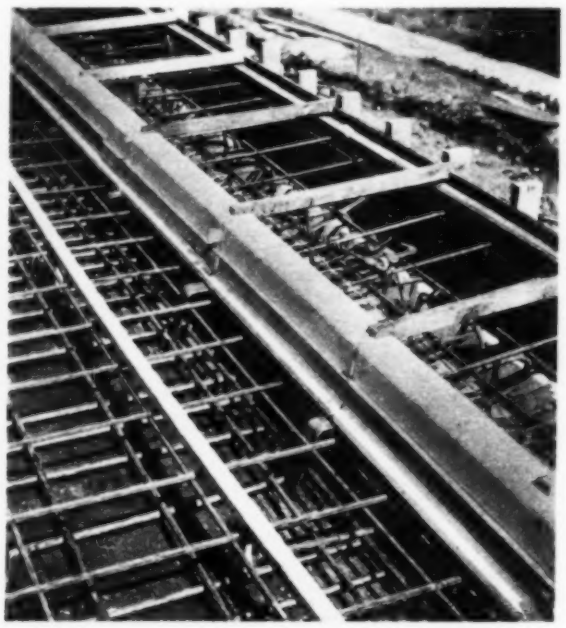


MEDIAN BARRIER between 22-ft. roadways is formed by two lines of white precast curb resting on steel chairs.

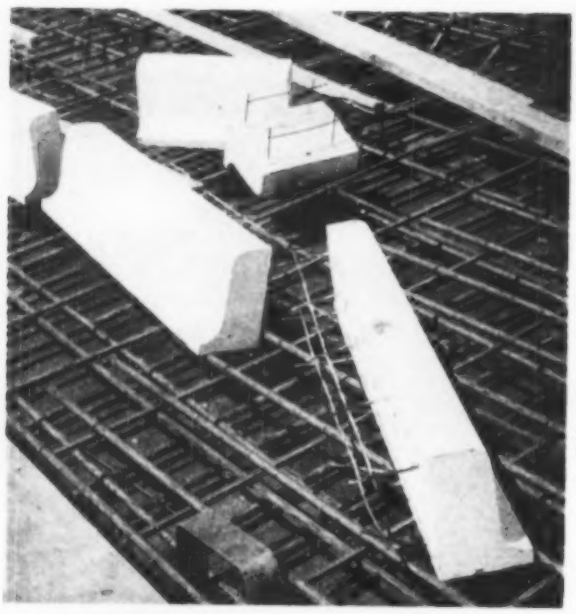


INCLOSED STORAGE SPACE is provided under roadway of each of viaduct's three approach ramps, as exemplified by this storeroom under north ramp of east approach.

INTERIOR COLUMNS of storage space are poured monolithically with beam and deck slab.

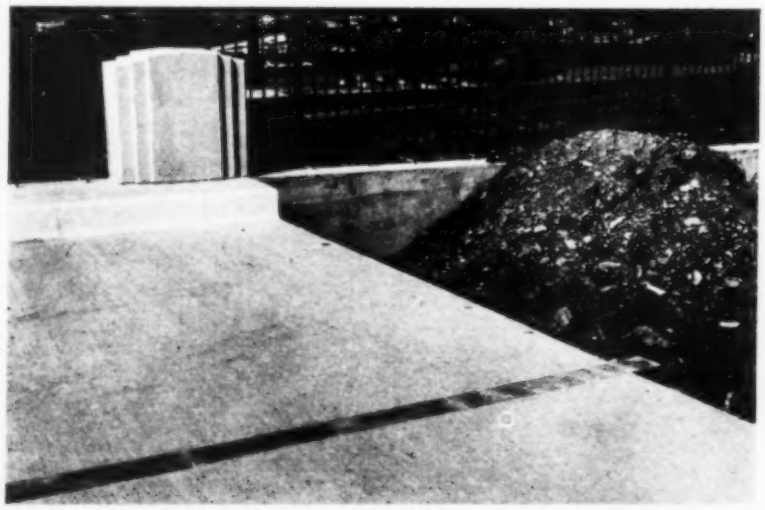


OUTSIDE CURB bordering 1-ft. 10-in. emergency walkway consists of white precast units resting on steel chairs, with spreaders and tiewires holding curb in position.



PRECAST CURB UNITS (left) made with white cement and white aggregate have dowel wire ties to anchor curb to backup concrete.

PRECAST TRAFFIC MARKERS of black concrete are manufactured in short units for installation in preformed slot in soft pavement concrete.

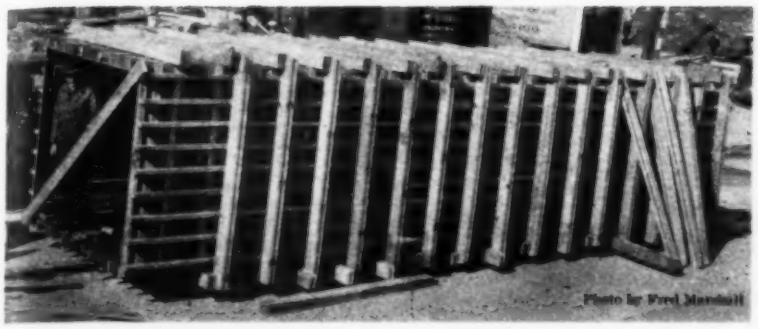


PERMANENT TRAFFIC STRIPE bonded in pavement slab consists of precast concrete units made with black aggregate.

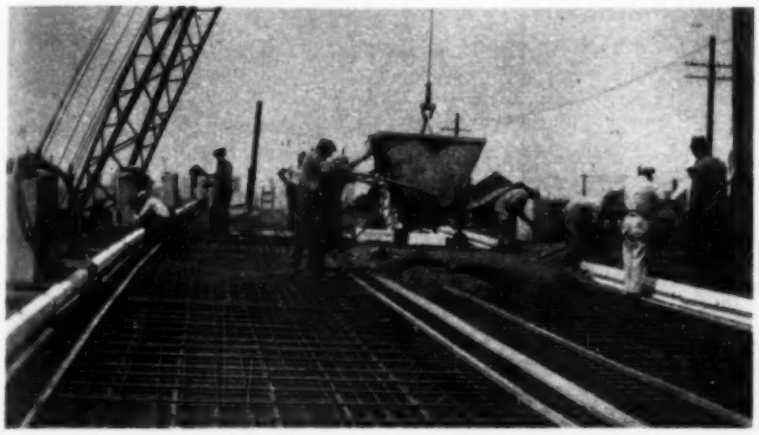
on hard clay. The caisson piers were excavated to a depth of 35 to 40 ft. below the grade of the existing street. Footing excavations were carried to relatively shallow depths averaging 10 ft. or less.

Substructure Contract — Construction of piers, retaining walls and roadway roof over the inclosed storage spaces called for 3,875 cu.yd. of concrete and 650,000 lb. of reinforcing steel. In addition, the eight caissons required 262 cu.yd. of concrete in the shafts and 50 cu.yd. in the caps. All concrete was mixed by a Koering 27E paver, and most of it was handled in 1-yd. buckets by a Thew Lorain crane.

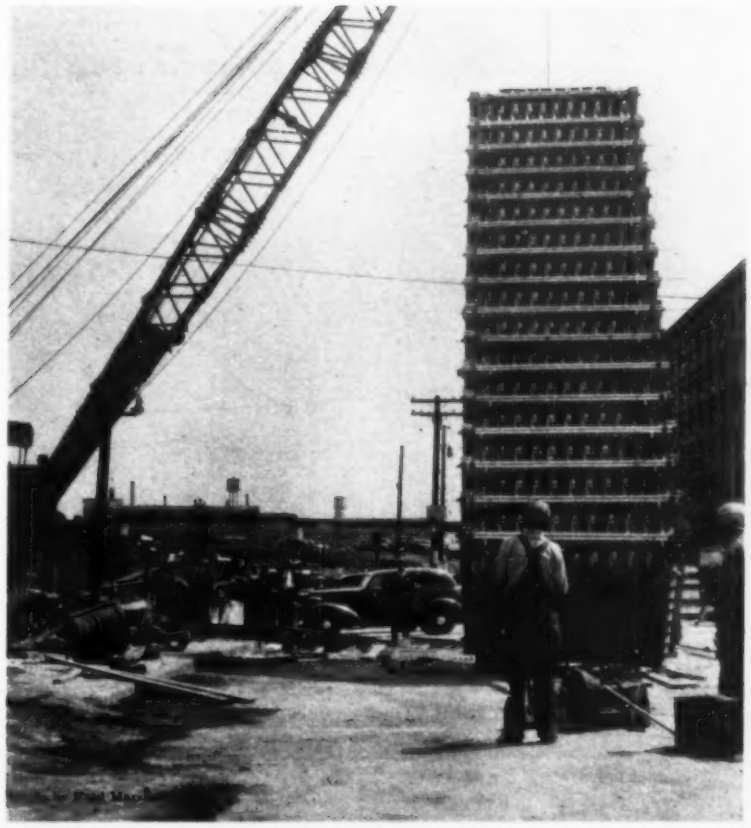
Formwork for exposed concrete above the foundations was built with 30,000 sq.ft. of plywood used repeatedly. Concrete placed in the forms was vibrated with Mall and Gaston electric flexible-shaft internal vibrators drawing power from portable gas-electric generators. The contractor prefabricated complete column form units on the job and set them in place with the crawler crane, as



COLUMN FORM of plywood backed up by 1-in. lagging and 2x4-in. studs is prefabricated with wales in place, ready for raising by crawler crane. Extended boom on converted shovel in background handles muck buckets out of caisson.



CONCRETE DECK over storage space is placed by crane and bucket. Wooden center-line strip is in position to form slot for precast permanent traffic marker. White precast curbs have been given coat of cold water paint to protect them against splashing concrete.



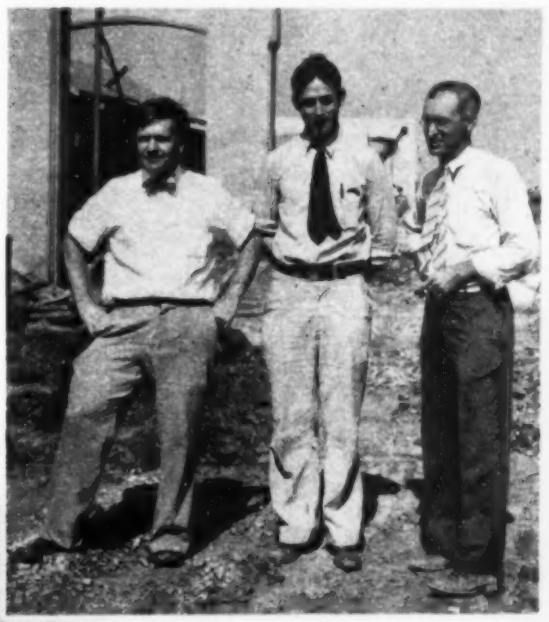
CRANE up-ends prefabricated column form preparatory to transporting it to position on pier footings.

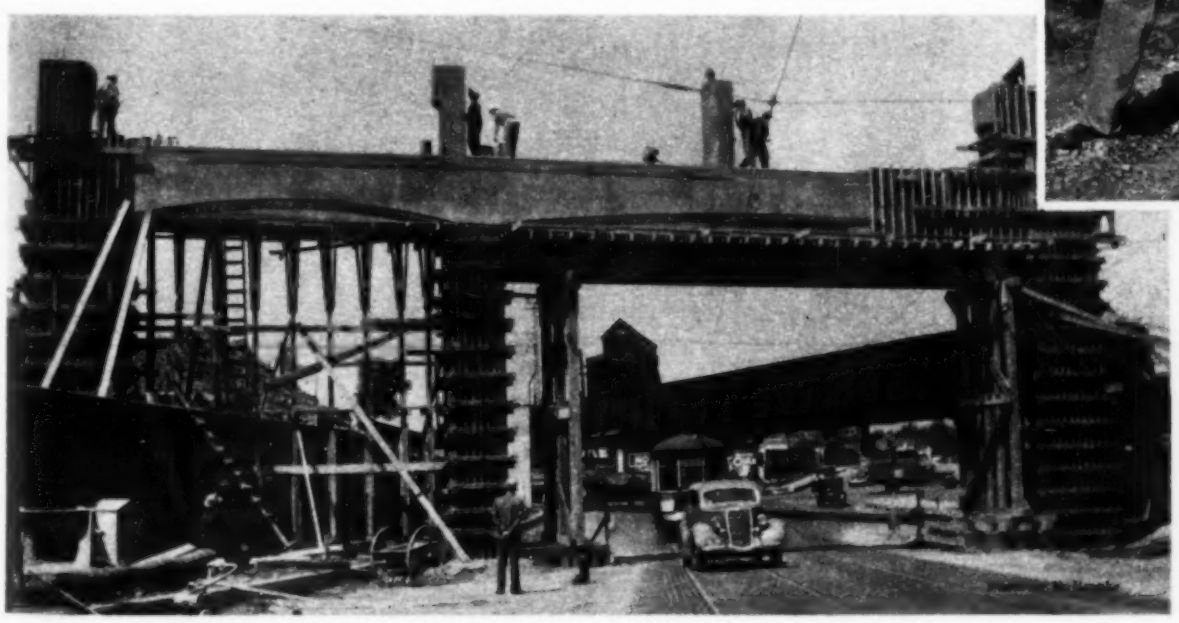
indicated by accompanying photographs.

Eight circular caissons were excavated by the open-well method, the holes being lagged with timber and braced internally with steel channel rings made up in semi-circular segments. Five caissons were 6 ft. 3 in. in diameter, two were 7 ft. and one was 4½ ft. Hard clay was the principal material encountered in excavating the caissons. Only two of the caissons required pumping, and an air-driven centrifugal pump proved effective in keeping these holes dry. On caisson work the contractor operated three 8-hr. shifts per day.

To break up old pavement and trim the rock foundations for the caissons, the job was equipped with three pneumatic pavement breakers and one jackhammer drill. Air to operate these tools was supplied by a 310-c.f.m. compressor. To handle clamshell excavation and muck buckets the construction force employed a Thew Lorain shovel with the dipper removed and the boom lengthened by addition of an extension to function as a crane. This machine also served at times as a pavement breaker, operating a drop-weight on a line from the tip of the boom.

IN CHARGE OF WORK on Ogden Ave. **(right)** viaduct are (left to right): K. JOHNSEN, supervising engineer, and K. L. BROWN, resident engineer, Illinois Division of Highways; and P. W. JOY, superintendent, Thomas McQueen Co., contractor.





STEEL FALSEWORK BEAMS on timber bents support beam forms of reinforced-concrete bent crossing Ogden Ave. on east approach.

Traffic Stripe and Curb—In building viaduct deck, the contractor installed permanent precast traffic mark-

(Continued on page 96)

"GOLF-TEE" COLUMNS

WITH HOLLOW STEMS

Require Special Forms, Reinforcement and Concrete Placing Methods on Johnson Building

"GOLF-TEE" COLUMNS (left) of reinforced concrete, with hollow tapering stems and circular "petals" at top, support roof of Johnson building. These columns, supported at base by cast-iron shoes, range in height from 21 ft. 7½ in. in main workroom to 30 ft. 11½ in. in lobby.

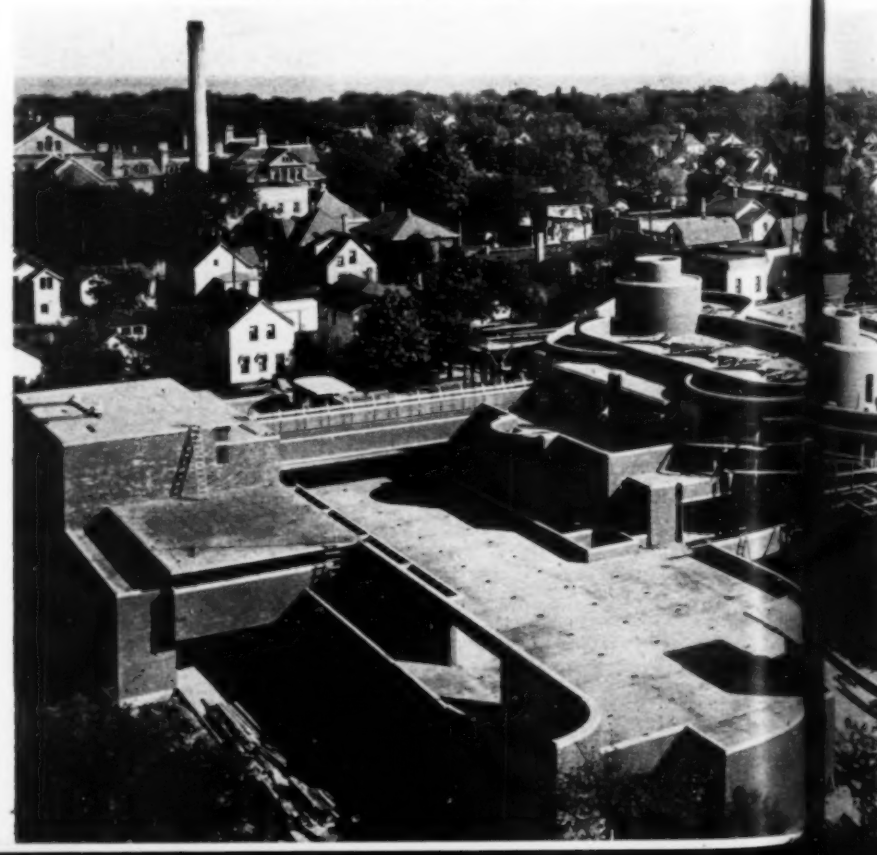
DESCRIBED BY ITS DESIGNER, Frank Lloyd Wright, architect, as "an architectural interpretation of modern business," the new office building in Racine, Wis., of S. C. Johnson & Son, Inc., makers of floor wax, is a structure unique in form, arrangement, use of materials and methods of construction. Among its features of structural interest are: Walls without a single window; a new form of slim, tapering, hollow concrete column with a flaring, circular cap, shaped like an elongated wooden "tee" such as golfers use in driving the ball down the fairway; horizontal bands of structural glass tubes to admit daylight; a main workroom, air-conditioned, which "breathes" through two "nostrils"; use of the main concrete floor slab, under which steam pipes are laid, as a radiator; a multi-domed flat roof slab; brick walls with a core of cork and concrete; extensive use of expanded metal for concrete reinforcement.

The main building, accommodating several hundred employees, is one large workroom 130x210 ft. in plan and 20 ft. high, with a mezzanine gallery 18 ft. wide and only 7 ft. above the floor extending around three sides of the structure. A lobby 30 ft. high, with a penthouse containing a group of executive offices, faces the fourth side of the main room. Two circular stacks constitute the "nostrils" through which the air conditioning plant functions.

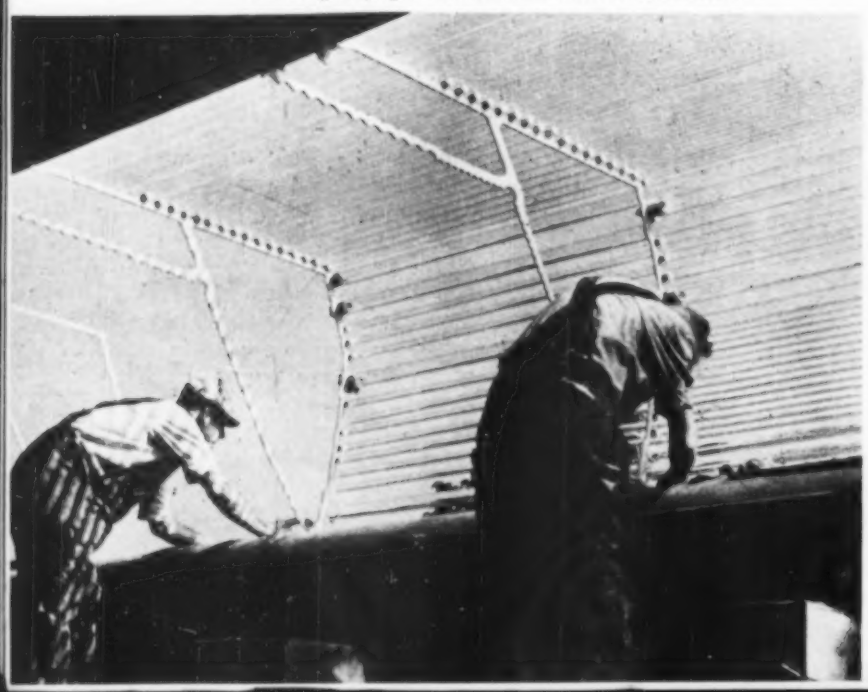
Main walls, 15 in. thick up to the mezzanine level and 11½ in. thick beyond that elevation, are of a special 3x9x2¼-in. size red brick laid up as a veneer around a central core of cork 3 in. thick with the intervening spaces filled with reinforced concrete. At a level 6 ft. above the floor, daylight is admitted to the structure by horizontal bands of 4-in. structural glass tubing, held in place by aluminum brackets and calked for weather tightness. A second band of glass tubes extends around the room as a cornice between wall and roof.

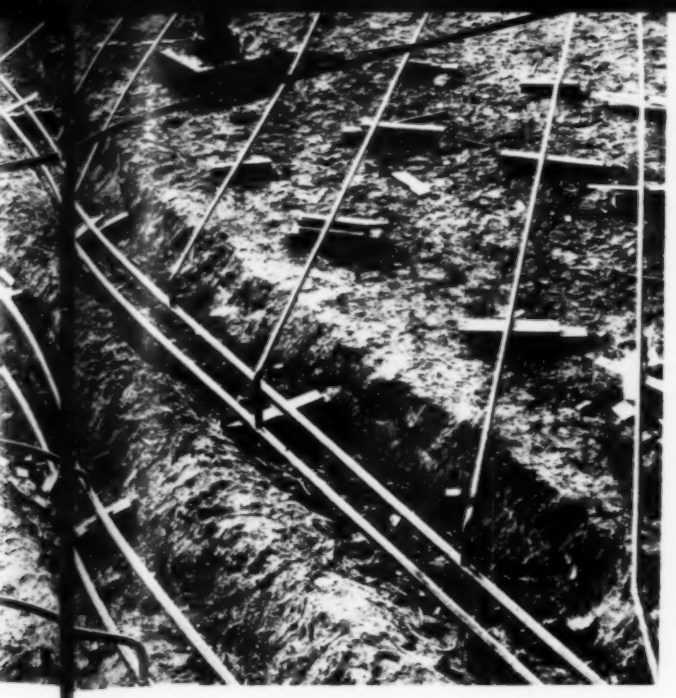
An innovation in heating systems

UNIQUE IN DESIGN. developed as an "architectural interpretation of modern business," the new office building for the Johnson Wax Company **(below)** is a structure with windowless cork-insulated walls and hollow "golf tee" concrete columns, with a main, 130x210-ft. air-conditioned workroom which "breathes" through two "nostrils."



GLASS TUBES (below) 4 in. in diameter, supported by aluminum brackets, form horizontal bands which replace windows as means of allowing daylight to illuminate interior of structure.





HEATING SYSTEM consists of loops of wrought-iron steam pipes to be embedded in layer of crushed stone beneath 3-in. concrete floor, which is thus made to serve as a "radiator."

PUMPED CONCRETE is delivered to all parts of building site through pipe line system from central mixing plant. Intricacies of formwork and reinforcement sometimes require concrete placement by wheelbarrow.

is provided by laying a grid of 1¼-in. wrought-iron steam pipes in a layer of coarse stone under the 3-in. concrete floor slab and using the latter as a radiator.

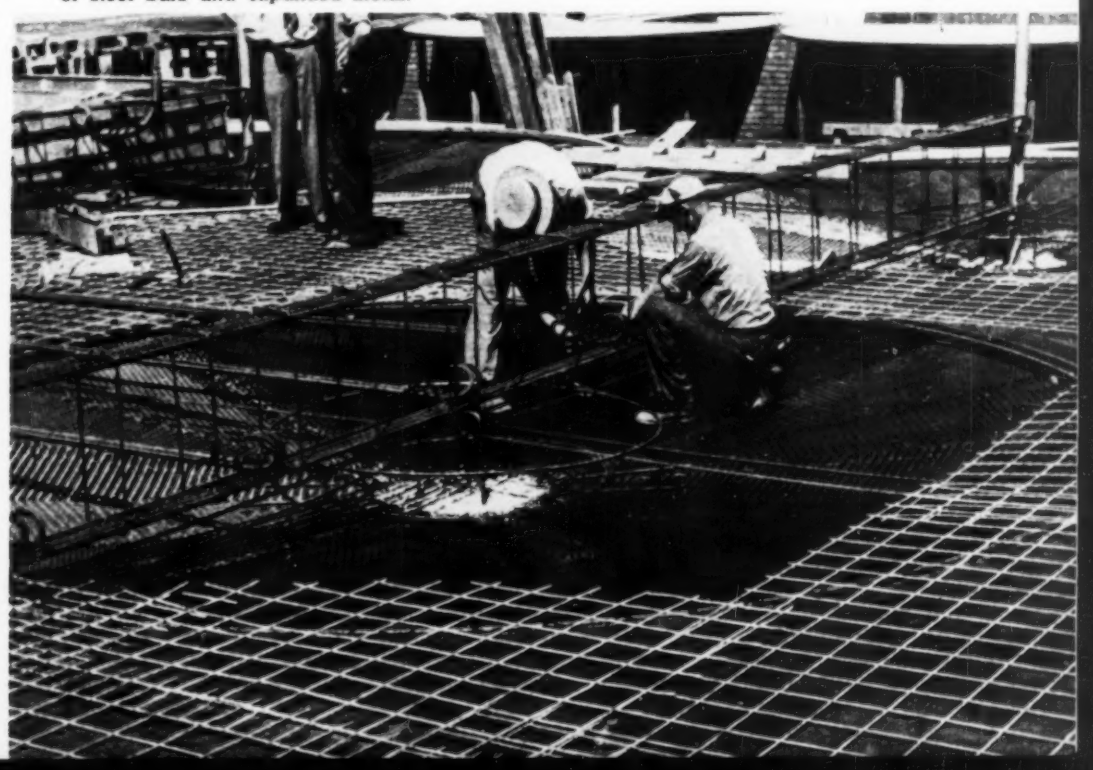
Of major construction interest is the method of concreting the unusual hollow "golf tee" columns supporting the roof of the main workroom. Spaced 20 ft. on centers in both directions, these columns are slender, tapering, hollow shafts 21 ft. 7½ in. high and 9 in. in diameter at the bottom, where they rest upon cast-iron shoes. Upward from its foot the diameter of the stem increases to 18 in. at the base of a "calyx" near the top and from that point spreads to a diameter of 3 ft. to support circular "petals" 18 ft. 6 in. in diameter, which form the roof slab. The thickness of the concrete in the vertical tapering hollow "stem" is 3½ in. and in the calyx, 5 in. The circular petals at the top are also hollow, consisting of 2½-in. thick top and bottom slabs stiffened by four concentric rings or circular concrete ribs of various widths and also by radial ribs. The tapering column stems are reinforced with cages of welded No. 10 expanded metal set within the forms. The inside and outside rings of the 18-ft. 6-in. concrete petals are reinforced with circular steel rods having diameters, respectively, of ¾ and 1¼ in. For the lobby portion of the building taller columns, 30 ft. 11½ in. high, are employed.

Because of the special construction

(Continued on page 86)

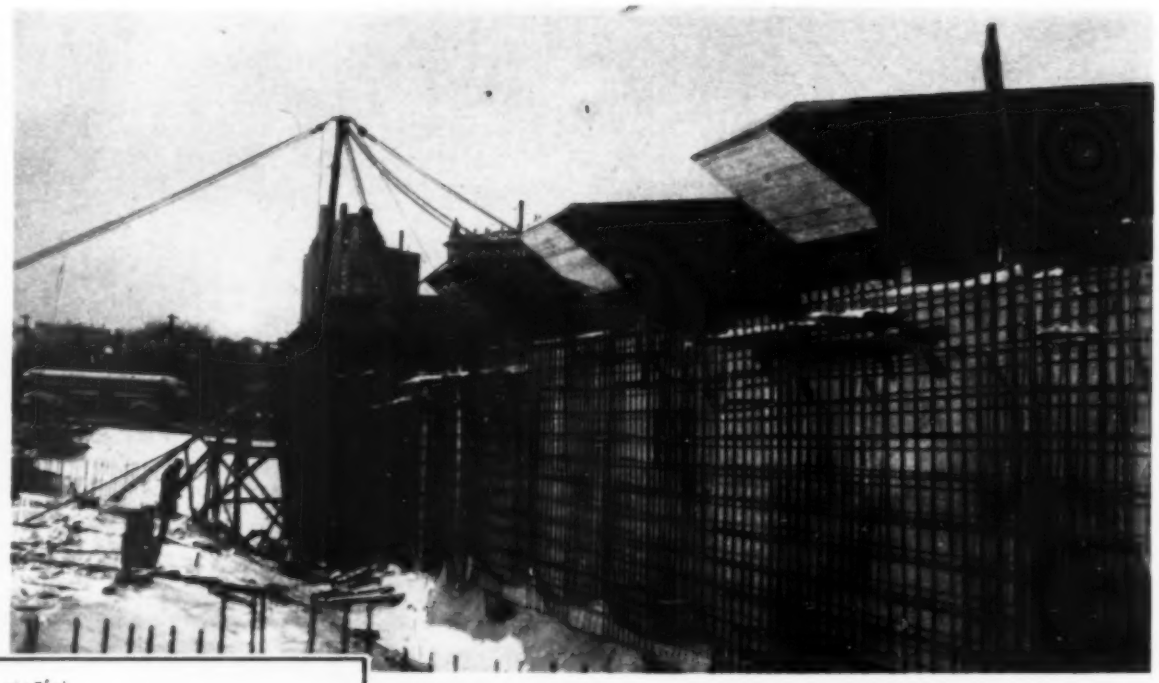
CORK SLAB 3 in. thick dipped in asphalt, is embedded in concrete between inner and outer courses of brick walls varying in thickness from 15 to 11½ in.

FLOOR CONSTRUCTION (below) in assembly room or theatre, involves elaborate reinforcement of steel bars and expanded metal.

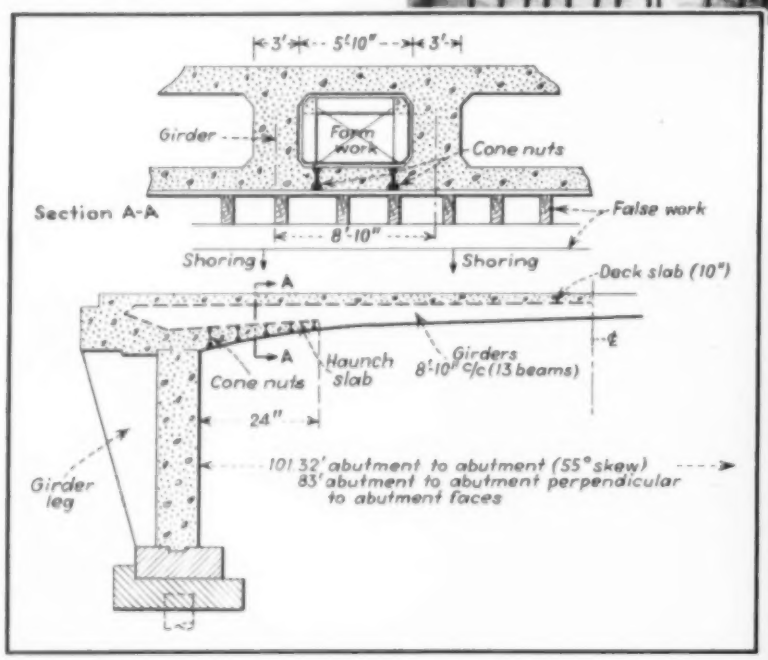


ADJUSTABLE SUPPORTS *for Bridge Forms*

ON THE NORTH AVE. grade separation project at Lincoln Park and Lake St., Chicago, it was necessary to support above the bottom of the deck slab, prior to concreting, box-section forms of wood for moulding the girders and haunch slabs that cantilever out from the abutment faces a distance of 24 in. The structure is a reinforced concrete rigid-frame bridge on a 55-deg. skew, with a distance of 101.32 ft. between abutment faces, measured on the skew line. Since the soffit of the deck slab is a parabolic curve, supports for the box forms had to vary in height. It was decided to employ the Universal Form Clamp cone nut and threaded stud rod assembly to provide for field adjustments in supporting the box forms, as illustrated herewith.



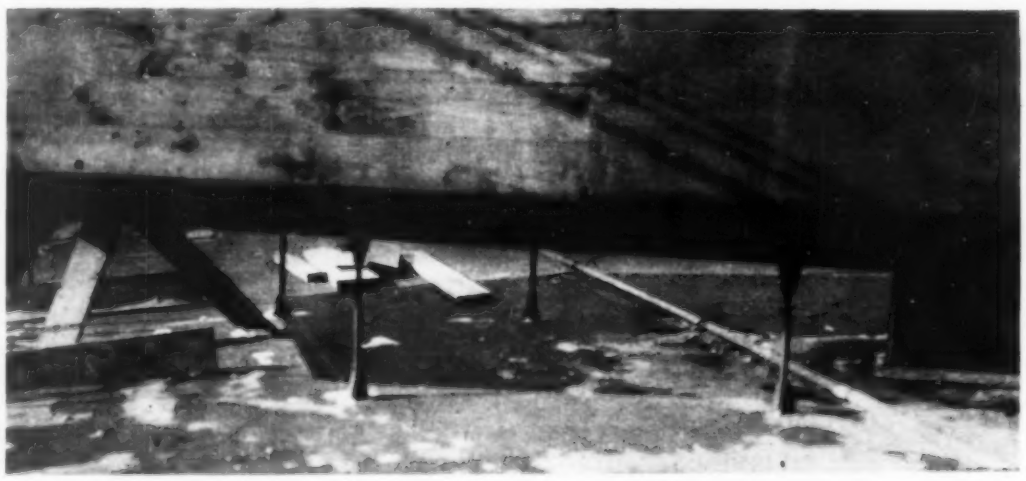
BOX FORMS in place for moulding girders for Chicago's North Ave. bridge, a reinforced concrete rigid-frame structure.



CONSTRUCTION DETAILS of forms, showing method of support by cone nut and threaded rod assemblies.

VERTICAL SUPPORTS (above and below) for wood forms are provided by cone nut and threaded stud rod assemblies which are adjustable in height to allow for curve of soffit of deck slab form on which they are carried.

In addition to providing adjustable supports for the forms during construction, the cone nut and rod assembly served another purpose. As the under side of the bridge is exposed to view, it was desirable to avoid discoloration of the concrete by the rusting of exposed metal. After the forms were stripped, therefore, the threaded cone nuts were unscrewed and removed from the stud rods, which remained embedded in the concrete. The holes were filled with cement mortar, leaving no metal of the form support exposed to cause unsightly rust stains.



Present and Accounted For

A Page of

PERSONALITIES

CONCHAS DAM. U. S. Engineer flood control, irrigation and water supply project on South Canadian River in New Mexico, forms background, during recent official inspection, for Governor CLYDE TINGLEY **(left)** of New Mexico who was escorted over job by CAPT. HANS KRAMER, Corps of Engineers, U. S. Army, district engineer in charge of building 235-ft. high concrete structure.

W. R. HUTCHINS who, since 1923, has served the Arizona Highway Department as district engineer and office engineer, was promoted to the rank of state highway engineer early this year, succeeding Howard S. Reed. A graduate of the University of Georgia, his first work was with the Arizona Copper Co. Later activities included service on railroad construction, in the Texas oil fields and as engineer of Graham County, Ariz. Mr. Hutchins is a past-president of the Arizona Section of the American Society of Civil Engineers.

ARTHUR W. BRANDT, for the last fifteen years commissioner of highways of New York State, has been named Superintendent of Public Works to fill the vacancy created by the recent death of Col. Frederick Stuart Greene. A graduate of Tufts, Capt. Brandt, with the exception of two years of war service, has been on the engineering staff of the state since 1912. He is a past-president of the American Association of State Highway Officials.

CHIEF ENGINEER of Pennsylvania's Department of Highways, succeeding Samuel W. Marshall, resigned, is T. C. FRAME who, until four years ago, was district engineer of the department at Franklin, where he makes his home. Mr. Marshall is now giving his full time to duties as chief engineer of Pennsylvania Turnpike Commission, building $60,000,000 160-mi. toll highway between Harrisburg and Pittsburgh.

DECORATED BY BELGIUM. In recognition of his services in directing construction operations on the Schelde River tunnel in Antwerp in 1930-32, FRANK W. BARNES, (above) now construction manager of Merritt-Chapman & Scott Corp., and formerly with Parsons, Klapp, Brinckerhoff & Douglas, consulting engineers of New York City, has received from King Leopold III citation to the rank of Officer of the Crown.

NEW PRESIDENT (left) of Association of Highway Officials of North Atlantic States is JAMES LOGAN, state highway engineer of New Jersey. Mr. Logan had previously served as vice-president of the organization and succeeds Francis J. Whalen.

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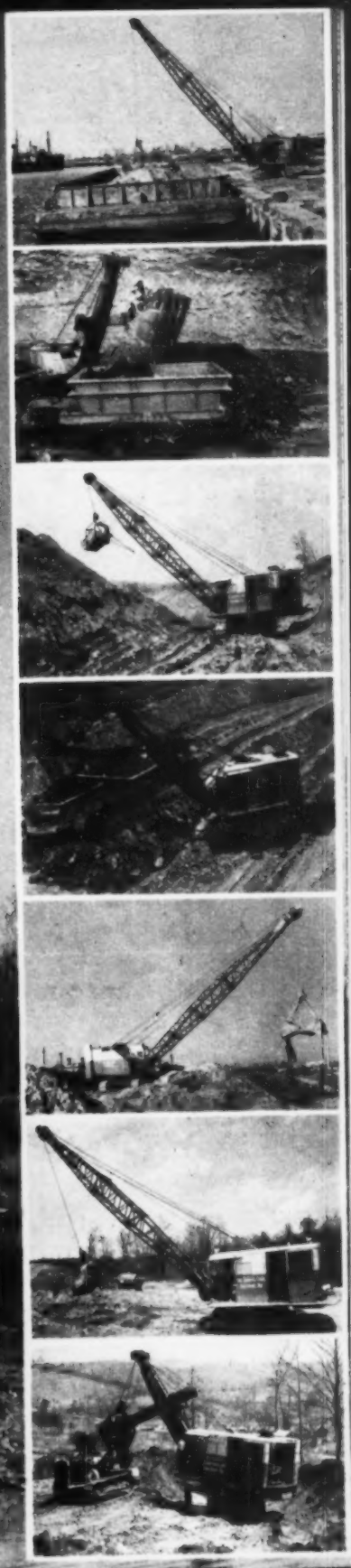

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Navy Department's Ship-Model Testing Basins

(Continued from page 40)

whirley with a 12-ft. circle had the rear end of its cab amputated to fit in the restricted alley between buildings on the other side.

Precast Concrete Panels — Use of precast exposed aggregate concrete panels as outside forms for columns and walls provided a striking and economical exterior facing for the buildings but retarded construction progress by the fact that concrete could be placed to only one-panel height at a time. Precast panels, molded either in flat slabs or in the shape of pilasters employing multiple vertical setbacks, were manufactured by the Dextone Co., at New Haven, Conn., in accordance with processes developed by John J. Earley, Washington, D. C., experienced architectural sculptor and consultant to the Turner Construction Co.

Panels were cast 2 in. thick, the outer 1 in. consisting of concrete made with crushed white quartz as the coarse aggregate, quartz screenings as the fine aggregate and white cement. This outer layer was backed with 1 in. of ordinary concrete placed and consolidated homogeneously with the first layer. All panels were reinforced with welded wire mesh of 0.3-in. wire in 4-in. squares. Precast pilaster panels ranged to a maximum size of 9 ft. wide by 10¼ ft. high.

Contract Quantities — Total construction cost of the Carderock plant is $3,500,000. The site was chosen because it provides solid rock foundations for the basins and structures at relatively shallow depth. Construction quantities included about 140,000 cu.yd. of earth excavation and 45,000 cu.yd. of rock excavation, removed under subcontract by Potts & Callahan, Baltimore, Md. Test basins and structures required about 2,600 tons of reinforcing steel, 45,000 cu.yd. of concrete and 140,000 sq.ft. of precast exposed aggregate concrete panels. Ratio of reinforcing steel to concrete is the highest of any contract executed by the Turner Construction Co. In some of the building columns the contractor had to resort to 1¾-in. square bars to get the required steel inside the narrow dimensions, welding lugs to the bars to develop sufficient bond with the concrete.

Completion Date—Contract for construction of the Carderock plant was awarded Aug. 12, 1937. The required completion date, with time extensions to allow for extra work, is Nov. 27, 1939. Construction will be completed about 6 months ahead of this date.

Administration — Design of the structures of the testing basins at Carderock, Md., was under the personal direction of Rear Admiral Ben Moreell, Civil Engineering Corps, U. S. Navy, chief of the Bureau of Yards and Docks, Navy Department, and construction is carried out under his general supervision. At the site, Commander Hugo C. Fischer, U.S.N., is the officer in charge of construction.

For the Turner Construction Co., general contractor, R. C. Wilson, vice-president, exercises supervisory direction of the work, with George F. Ferris, superintendent, in charge at Carderock.

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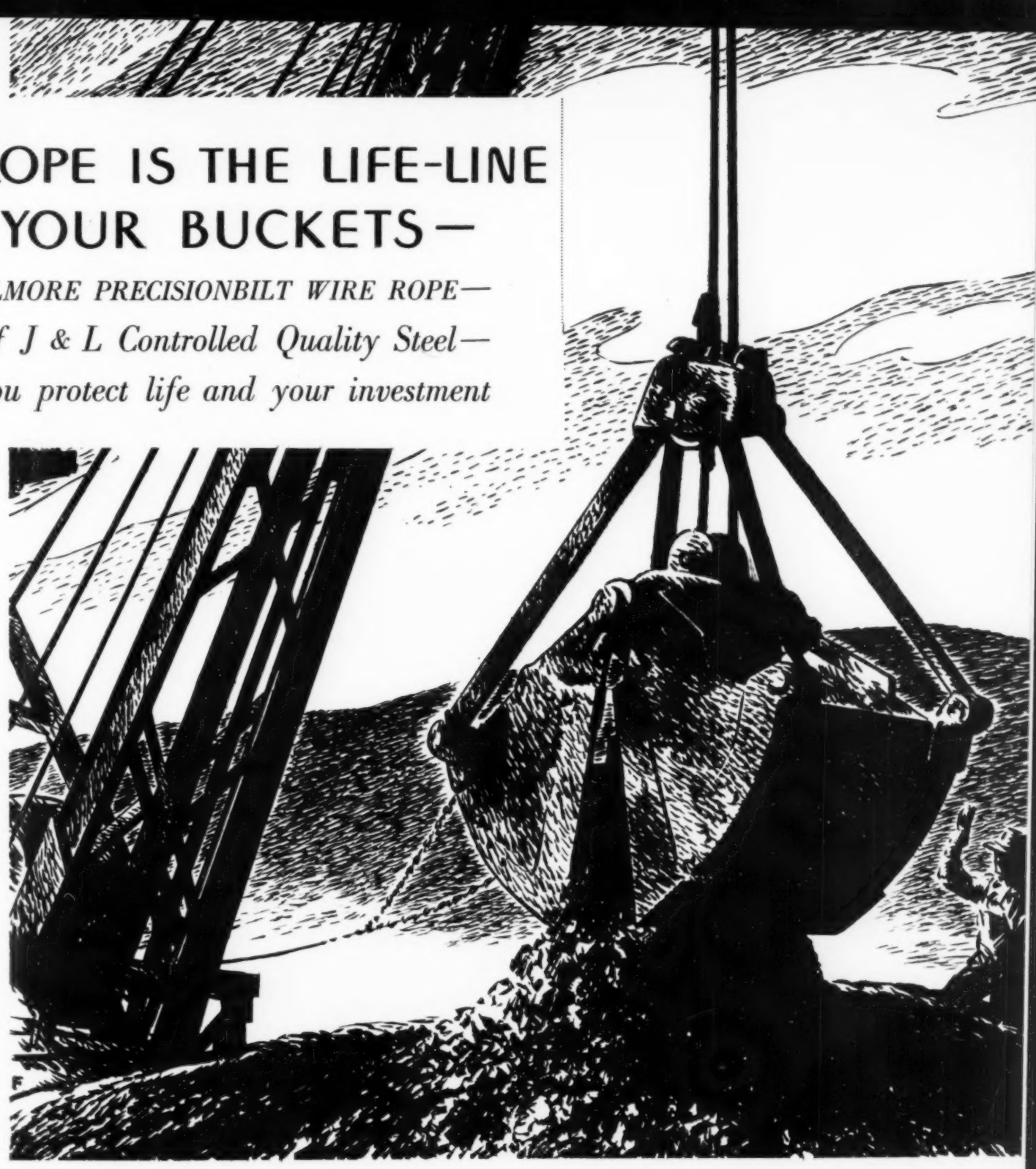

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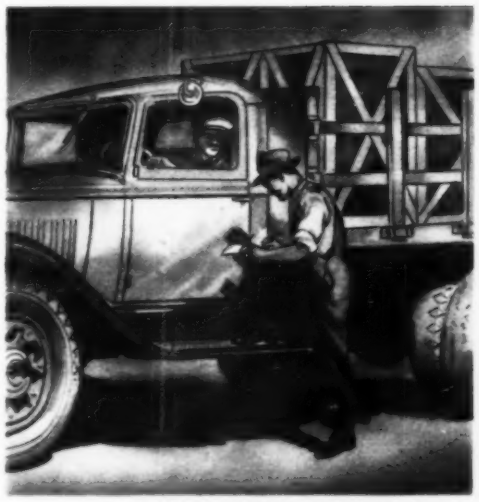

5 EMERGENCY SHIPMENTS can be made from our 28 warehouses, located in every part of the United States. They maintain full stocks of standard equipment. Suppose you suddenly need motors for emergency pumping work. A telephone call tonight will put them on your job tomorrow.

6 THE NETWORK of G-E sales offices, service shops, and warehouses. You're never outside the friendly circle of G-E service. G-E equipment is also available through the offices of the G. E. Supply Corporation and of hundreds of G-E motor dealers, none of which are shown here.

G-E Sales Engineers Near Your Job

Akron, Ohio
Atlanta, Ga.
Baltimore, Md.
Bangor, Me.
Bay City, Mich.
Beaumont, Texas
Binghamton, N. Y.
Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Butte, Mont.
Canton, Ohio
Carterville, Ill.
Cedar Rapids, Iowa
Charleston, S. C.
Charleston, W. Va.
Charlotte, N. C.
Chattanooga, Tenn.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
Dallas, Texas
Davenport, Iowa
Dayton, Ohio
Denver, Colo.
Des Moines, Iowa
Detroit, Mich.
Duluth, Minn.
El Paso, Texas
Erie, Pa.
Evansville, Ind.
Flint, Mich.
Fort Wayne, Ind.
Fort Worth, Texas
Grand Rapids, Mich.
Greenville, S. C.
Hartford, Conn.
Houston, Texas
Indianapolis, Ind.
Jackson, Mich.
Jackson, Miss.
Jacksonville, Fla.
Kansas City, Mo.
Knoxville, Tenn.
Lansing, Mich.
Lincoln, Nebr.
Los Angeles, Calif.
Louisville, Ky.
Madison, Wis.
Memphis, Tenn.
Miami, Fla.
Milwaukee, Wis.
Minneapolis, Minn.
Nashville, Tenn.
Newark, N. J.
New Haven, Conn.
New Orleans, La.
New York, N. Y.
Niagara Falls, N. Y.
Oklahoma City, Okla.
Omaha, Nebr.
Peoria, Ill.
Philadelphia, Pa.
Phoenix, Ariz.
Pittsburg, Kan.
Pittsburgh, Pa.
Portland, Me.
Portland, Ore.
Providence, R. I.
Raleigh, N. C.
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Rockford, Ill.
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Salina, Kan.
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San Antonio, Texas
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San Francisco, Calif.
Schenectady, N. Y.
Seattle, Wash.
Shreveport, La.
Sioux City, Iowa
South Bend, Ind.
Spokane, Wash.
Springfield, Ill.
Springfield, Mass.
Syracuse, N. Y.
Tacoma, Wash.
Tampa, Fla.
Toledo, Ohio
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Utica, N. Y.
Washington, D. C.
Waterbury, Conn.
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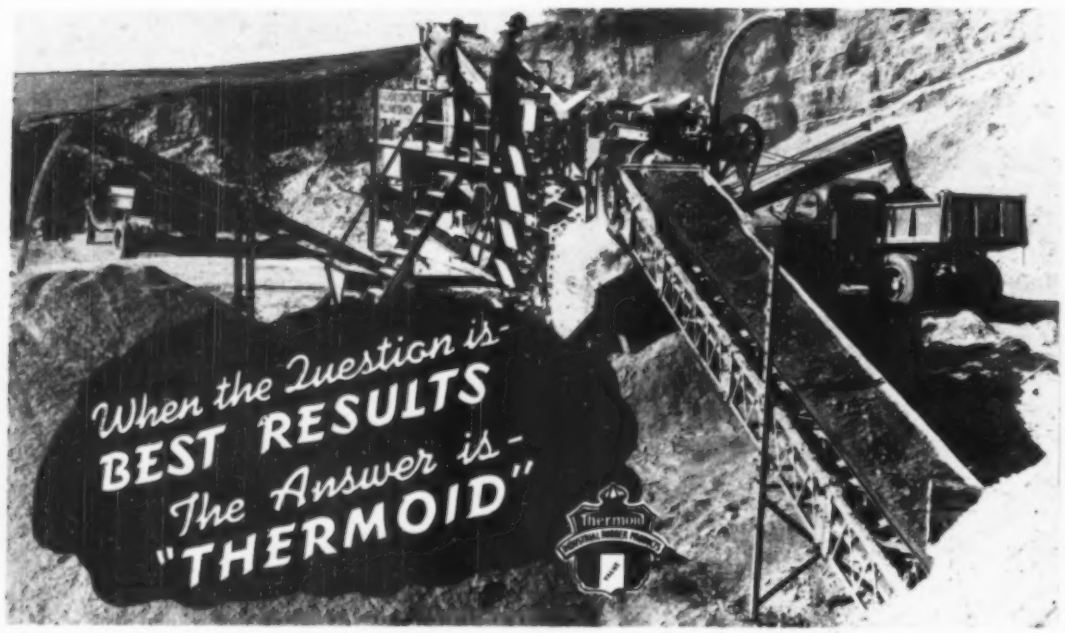
YOU GET GREATER SPEED AND SAFETY—CLEAR A BIGGER NET—WHEN YOU OPERATE ELECTRICALLY

GENERAL ELECTRIC

011-488-A



Whether your conveying jobs are large or small, Thermoid can equip you with Conveyor Belting or Grader Belting, specifically engineered to best carry the type of material you have to handle.

Thermoid's half century reputation for the finest in industrial rubber products is based upon these three factors. 1. Complete, and practical engineering knowledge of the uses for which a product is designed. 2. The use of the finest raw materials. 3. The use of the most modern and effective manufacturing methods.

Those are the factors that guarantee you the ultimate in service and economy on every Thermoid Industrial Rubber Product you use.

THERMOID RUBBER, DIVISION OF THERMOID COMPANY, TRENTON, N. J.

Thermoid

FLAT AND V BELTS • HOSE • PACKINGS • BRAKE LININGS

ROGERS *has built* **HEAVY DUTY TRAILERS**

exclusively **FOR 25 YEARS**

•EXPERIENCE *built it* • • • •PERFORMANCE *sold it* • • •

This experience assures getting a trailer exactly suited to your needs—

designed for strength with lightness—

that hauls faster with less power—

that is under safe, dependable control at all times.

ROGERS BROTHERS CORPORATION

220 ORCHARD STREET ALBION, PENNA.

Wagner Labor Relations Act

(Continued from page 41)

labor organization and that organization has repeatedly violated its agreement, the employer is nevertheless obligated under the law to continue to recognize it and deal with it. Proper protection of the employer by prescribing in the Act minimum standards of conduct for those with whom he is compelled by law to deal should be enacted.

(6) The board has erred in numerous cases in limiting the right of employers and employees to confer freely about their mutual problems and has thus interposed a serious impediment to free speech between employers and employees. The Act itself should reiterate the right of free speech as between employers and employees.

(7) It should be made clear that the Act is not designed to build up national or international labor unions to the exclusion of local labor organizations or independent unions not affiliated with such national or international groups. In practice, the labor board has favored one type of labor organization over the other. Its power to do so in future should be clearly restricted.

(8) The Act should be amended so as to assure a fair trial and adequate court review to all those accused of violating any provisions of the law. Important changes should be made to insure that the board shall be fair and shall operate under reasonable restrictions as to hearings, the admission of testimony, the subpoenaing of witnesses, etc. so as to assure fair and full consideration which the Supreme Court has declared to be a matter of common right under our American form of Government.

Collective Bargaining Endorsed

The association emphasized that it believed the purpose of the Act to safeguard the right of collective bargaining "a thoroughly justified" one. "We have no desire" the statement said, "to curtail in any way the right of men who wish to bargain collectively, to do so through their voluntarily chosen representatives."

Recalling that proponents of the Act had advanced it as a method for peaceful settlement of industrial disputes, the association asserted: "The country has witnessed since the National Labor Relations Act went into effect, a wave of sit-down strikes and other strikes involving violence and intimidation, such as it has never before seen. In none of its decisions or public statements by its members has the National Labor Relations Board taken a stand against such conduct on the part of unions and their members. On the contrary, in numerous decisions the board has ordered employers to reinstate — in many cases with back pay — employees who engaged in sit-down strikes and other forms of unlawful conduct during the course of disputes with their employer. This clearly wrong construction of the National Labor Relations Act by the board continued until the Supreme Court of

(Continued on page 74)

NEVER BEFORE!

A LINE OF PUMPS WITH *are* OF THESE FEATURES

3M 7M 10M 15M 20M 30M 40M 75M 90M 125M

ELECTRIC PUMPS

BELT-DRIVEN PUMPS

Never before has there been a self-priming pump that could give you the honest-to-goodness, down-right value and the many features found in the Novo Model "K" Self-Priming Centrifugal Pumps.

FAST PRIMING that is as sure as an old friend for there is nothing to prevent priming if your suction line tight, and that's priming performance that will last through years of operation.

VOLUME that meets with ease all of the standards set up by the Associated General Contractors America, Inc., for every size pump. Here is your protection against wild claims for pump volume a operation. The contractors, themselves, rated our pumps.

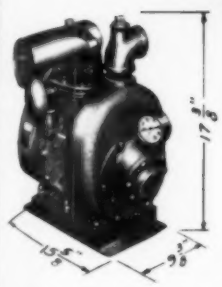
WEAR PLATES. Where extreme wear has occurred, it is a very simple matter to compensate by the removable and adjustable wear plates that are installed on both sides the impeller.

ACCESSIBILITY. These pumps are almost as accessible as your old co pockets. You can remove the impeller by just taking off the outer pum plate. None of that clumsy, time-consuming dismantling of the pump removing the power unit from outfit to get at the impeller.

RELIABLE VALVES. The check valve is not of the usu rubber but is made of Neoprene, that scientific develo ment that has twice the wear-resisting qualities rubber and has many times more resistance to oxidatio Neoprene resists chemical and oil deteriorating actio

LOOKS. Novos have the smoothest, neate lines of any self-priming pumps. Th appearance is a credit to any man's for they reflect sound engineering judgme and the progressive trend of smooth desi

GUARANTEED to meet t A.G.C. standards for self-primi pumps, size for size and in ev respect — standards up by the country's lea ing and most exacti progressive contractors



Novo 1½", 3,000 GPH Pump. Weighs 70 lbs.

THESE PUMPS COMPLY WITH A. G. C. STANDARDS.

Right now is the time to start enjoying the savings you make by using Novo Pumps. Be fair with yourself and take advantage of all their super features that no other pump can give you.

A complete line of Self-Priming Centrifugal Pumps straight through from the light-weight, 3M or 1½"—3,000 GPH Pump to the giant capacity, heavy-duty 8"—125,000 GPH Pump. All can be furnished gasoline or electric powered or less power. - - - - - -

Mountings are available to suit any job—pneumatic or steel wheels, carrying handles, skids, etc. SEE THEM ALL IN THE NEW BULLETIN NO. 175, FREE ON REQUEST.

NOVO ENGINE COMPANY
LANSING, MICHIGAN

Mail this coupon today!

Send new Bulletin No. 175 on complete line of Novo Self-Priming Centrifugal Pumps with A. G. C. performance tables.

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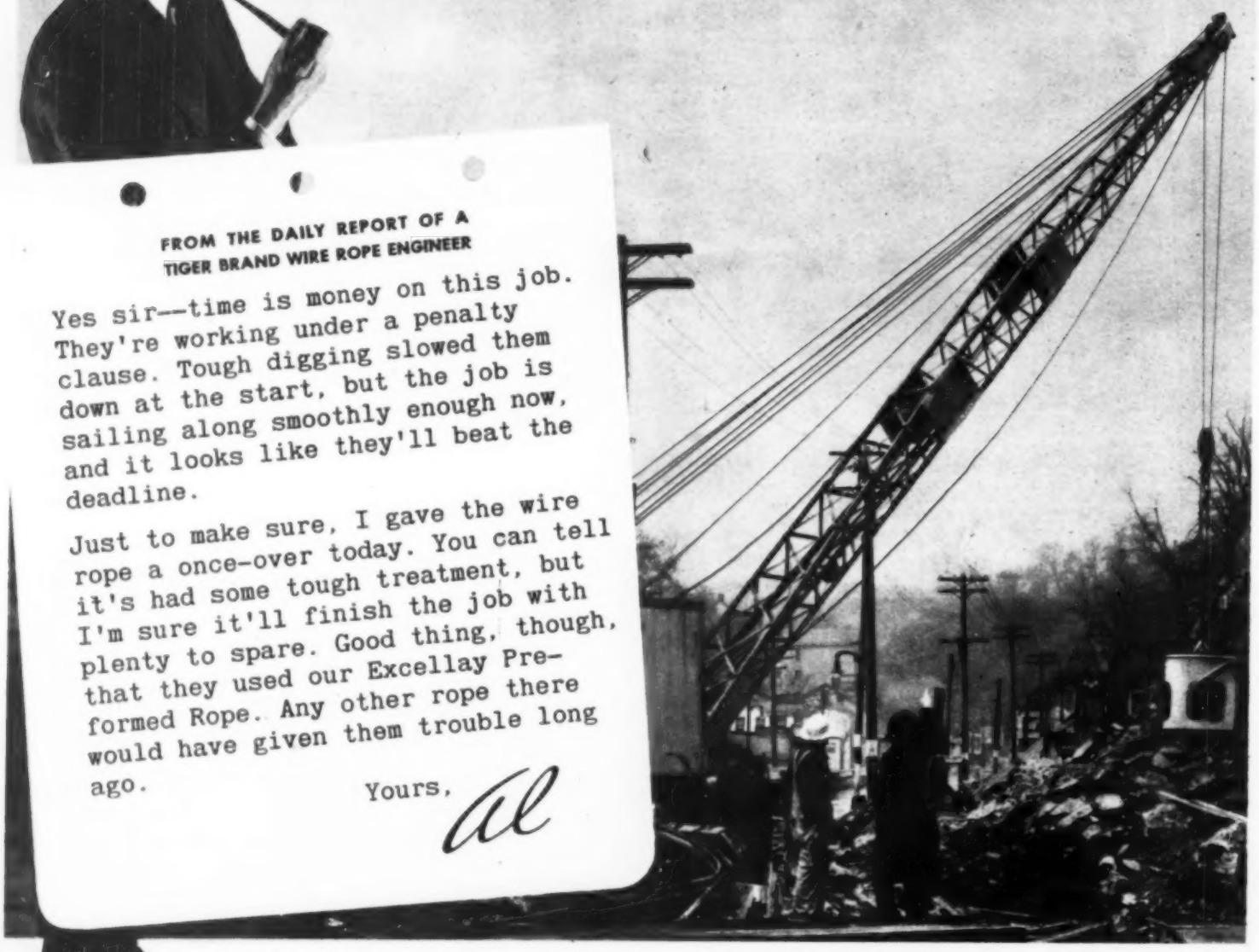
...GOOD THING THEY USED EXCELLAY HERE

FROM THE DAILY REPORT OF A TIGER BRAND WIRE ROPE ENGINEER

Yes sir—time is money on this job. They're working under a penalty clause. Tough digging slowed them down at the start, but the job is sailing along smoothly enough now, and it looks like they'll beat the deadline.

Just to make sure, I gave the wire rope a once-over today. You can tell it's had some tough treatment, but I'm sure it'll finish the job with plenty to spare. Good thing, though, that they used our Excellay Preformed Rope. Any other rope there would have given them trouble long ago.

Yours, *Al*



TURN your wire rope questions over to a Tiger Brand Wire Rope Engineer. He lives and breathes wire rope, spends most of his time seeing it in action, checking its performance, studying ways and means of saving you money.

These engineers know what they are talking about, because they spend most of their time right out where the rope is used. They know what punishment it has to stand and how to stretch your wire rope dollar. Besides, they have no axe to grind—they are not interested in promoting any one construction or grade of wire rope over any other. For American Tiger Brand Wire Rope is made in all constructions and all grades.

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EXCELLAY *Preformed* **WIRE ROPE**

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York

COLUMBIA STEEL COMPANY
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UNITED STATES STEEL

STANDARD OIL AUTOMOTIVE ENGINEERING SERVICE

COSTS....NOTHING
SAVES.... $ $ $ $

ASK THESE FLEET OPERATORS

HELPS KEEP CONTRACTOR'S FLEET IN TIP-TOP SHAPE

● BEFORE the construction season starts each year, Wm. Lathers, Jr., road contractor at Madison, Wisconsin, calls in the Standard Automotive Engineer. This Engineer and Fleet Foreman Rudolph Dreyer look over the engines in the trucks, tractors, and shovels in this fleet. Ignition systems are tested for worn parts, carburetors are checked and set for highest combustion efficiency with modern instruments. During the past two years fleet efficiency has been increased 21%.

Besides saving gasoline, this increased fleet efficiency means fewer breakdowns on the job, more dirt moved or more miles of road built in the short construction season. See your Standard Automotive Engineer now. His service costs you nothing.

PACKER SAVES 8% ON GASOLINE

Even on the modern delivery equipment operated by the Peet Packing Co., Bay City, Michigan, a Standard Automotive Engineer was able to reduce gasoline costs 8% and increase motor oil mileage. With well over a half-million miles of operation yearly from this one plant, this 8% means a substantial money saving. With the Automotive Engineer on the job this saving will continue year after year.

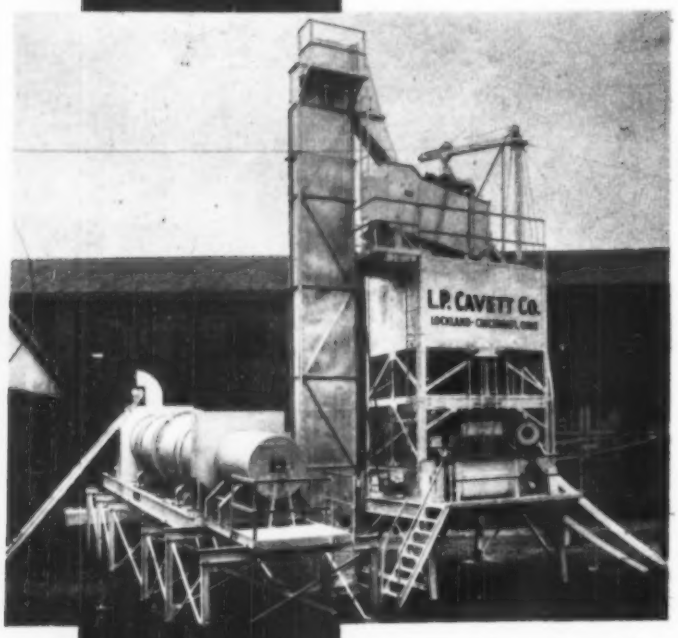
CHECKS CARBURETORS FOR TAXI SERVICE . . . SAVES 10%

As part of the routine in a fleet survey, a Standard Automotive Engineer checked the carburetors on a fleet of taxis. He found that all of them were set for high speed operation, whereas 95% of the mileage these cabs traveled was at 25 to 30 miles per hour.

With the correct setting on these carburetors for taxi operation, this company saved 10% on their gasoline bill alone.

Regardless of the type of fleet you operate, Standard Automotive Engineers have many money-saving suggestions to offer. If you are located in the 13 Midwestern states served by these engineers, their helpful advice and modern troubleshooting equipment and methods may be had without any cost to you. Call your local Standard Oil (Indiana) office or write 910 S. Michigan Avenue, Chicago, Illinois, for the engineer nearest you.

STANDARD OIL COMPANY (INDIANA)



MODEL P-A PLANTS ARE BUILT IN 4 SIZES

MODEL PA-15
1500# Mixer

MODEL PA-20
2000# Mixer

MODEL PA-30
3000# Mixer

MODEL PA-40
4000# Mixer

A NEW PORTABLE ASPHALT PLANT

in completely assembled sectional units easily moved by truck or rail and quickly erected without the use of a crane or gin pole.

Patents applied for — Built in 4 Sizes

Write for Bulletin T-260

HETHERINGTON & BERNER, INC.

701-745 Kentucky Avenue — Indianapolis, Ind.

It's a SPEEDLINE

END DISCHARGE 7S-10S-14S

OTHER MIXERS 3½S to 56S

Latest Type Speed Mixers!

Fastest, easiest handling, lightest yet huskiest mixers Jaeger has ever built — end discharge trailer type (2 or 4-wheel mountings interchangeable), need 50% less street room. ***Machined Steel Drum Tracks***—many improvements. Low prices. Get Catalog.

THE JAEGER MACHINE CO.
800 Dublin Avenue, Columbus, Ohio

JAEGER

CAVE-INS are risky and costly

and they are prevented by using Simplex Trench and Timber Braces. They're better and stronger because they're drop forged. Safety lever nuts are blunt — not pointed. They screw into place in a jiffy, stay put and withstand years of roughest handling.

Send for bulletin on trench and timber braces, tunnel roof supports, pipe pushers, shoring and house-movers' jacks and other jacks for construction projects.

TEMPLETON, KENLY & CO., Chicago.
Better, Safer Construction Jacks Since 1899.

SIMPLEX
GOLD MEDAL AWARD SAFETY JACKS

(Continued from page 70)

the United States, in its decisions of Feb. 27, 1939, called a halt.

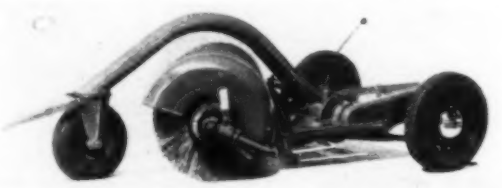
Court Rules Sit-Down Strikes Illegal

"The clear-cut declaration by the Supreme Court that the sit-down strike 'was a high-handed proceeding without a shadow of legal right,' is properly hailed as an utterance of the greatest significance. There is danger, however, that many people will feel that the decision of the Supreme Court in this important matter has rendered unnecessary Congressional revision of the National Labor Relations Act. On the contrary, the decisions of the court have emphasized the necessity of Congressional action, for these decisions deal only with one or two outstanding situations which have arisen in the course of administration of the Act. There are many defects in the Act and its administration which are not in any way corrected by the decisions of the Court.

"Aside, however, from the fact that the National Labor Relations Board has been reversed in several respects by the Supreme Court, it is obvious that the Act should be amended so that the board will no longer have any grounds for forcing those wronged by its decisions to go to court in order to secure redress. Many employers and organizations of employees adversely affected by decisions of the board cannot afford the burden of long-drawn-out and expensive litigation. The statute itself should be so clear that the board no longer has the excuse to pervert it into a punitive and oppressive instrument.

"Furthermore, all those who have a stake in preserving the integrity of our judicial system should join in urging the Congress to clarify the National Labor Relations Act. It is unfair to the courts that they should have thrown upon them the burden of interpreting a vague statute when the Congress could so easily clarify the statute to express in definite terms the rights and obligations it embraces. Failure on the part of Congress to discharge this responsibility places the courts in the unenviable position of being the recipients of criticism and abuse when they discharge what must be a very unwelcome duty. If the Congress will make its statute clear and definite, it will serve the public interest by defining and clarifying the area of Labor Board discretion and obviating the necessity of Court interpretation of what should have been clear enough that it needed little interpretation."

TRACTOR-DRIVEN ROAD SWEEPER for use in county and state road maintenance, is equipped with 7-ft. 30-in.-diameter brush adjustable to ground pressure and to crown of road. Power for driving brush comes from left rear wheel and is transmitted



through three-speed standard automotive transmission running in oil and inclosed in dust-proof case. Brush may be operated with three speeds by mere shifting of gear lever into proper position. Machine equipped with tow pole for hitching either to truck or tractor. — **The Frank G. Hough Co., 919 N. Michigan Ave., Chicago, Ill.**

Over 25 MILLION ATLAS MANASITE DETONATORS

have been used in the brief space of time since their introduction

Another "ATLAS FIRST" *for* GREATER SAFETY

Have men responsible for safety in blasting operations welcomed the new Atlas Manasite Detonators? *Yes!* Purchases of over 25 million detonators answer this question.

Atlas Manasite Detonators make safety precautions more effective by lessening the possibility of accident from inadvertent mishandling.

Through an exclusive method of using hexanitromannite as an initiating compound, Atlas Manasite Detonators offer materially decreased sensitivity to impact and friction—with no loss in detonating efficiency—and no increase in price!

Ask your Atlas Representative for full details.

ATLAS MANASITE

BLASTING CAPS. ELECTRIC BLASTING CAPS. DELAY ELECTRIC BLASTING CAPS

ATLAS POWDER COMPANY, WILMINGTON, DEL.

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Everything for Blasting

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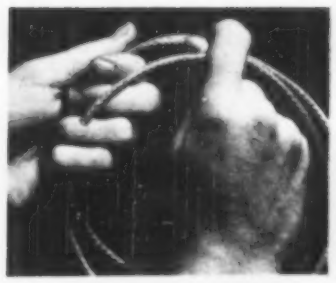
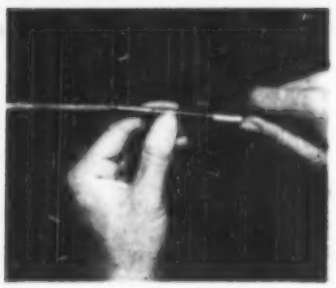
ATLAS

EXPLOSIVES

CHEMICALS ATLAS EXPLOSIVES





PRIMACORD ·BICKFORD Detonating Fuse

PENTAERYTHRITETETRANITRATE*. . . . .

hard to pronounce but easy to use

Primacord has broadened the use of detonating fuse. Because of its special textile covering — light, flexible, waterproof, strong — it is very easy to use. No special tools are required. Because of its core of *PETN it detonates along its entire length at a speed of 3.9 miles per second. This speed is practically instantaneous, yet permits shots planned to relieve burden, resulting in better fragmentation — more useful work from the explosive charges.

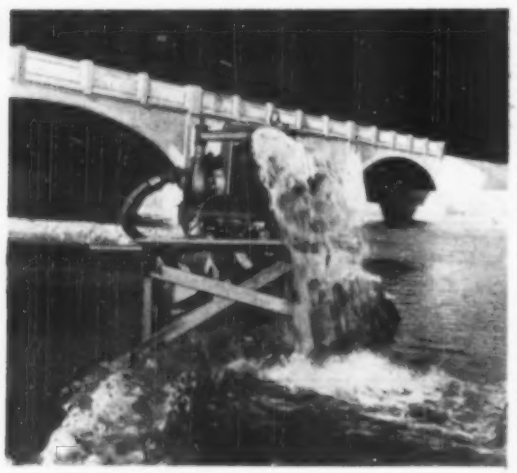
Full details are contained in the Primacord Booklet — free upon request. THE ENSIGN-BICKFORD COMPANY, Simsbury, Conn. Makers of Cordeau-Bickford Detonating Fuse — and Safety Fuse Since 1836.

PRIMACORD·BICKFORD *Detonating Fuse*

PB-8

C.H.&E.

SELF-PRIMING PUMPS



- PRIME FAST
- GIVE LARGE CAPACITY
- HANDLE MAXIMUM SOLIDS
- ARE DEPENDABLE

Our new 16 Page Catalog will give you full details on all sizes 1½" to 8".

Also Saw Rigs, Hoists Rollers — a full line of construction equipment.

C. H. & E. MANUFACTURING CO.
3847 N. Palmer St. Milwaukee, Wis.

Built to Cut Costs on Every Air Tool Job!

"GJ-DIXON"
GROUND JOINT
AIR HAMMER COUPLINGS

Because of their unequalled efficiency, convenience and dependability, these couplings insure important savings in the cost of operating all makes of hand hammers and rock drills, in every kind of service. The ground joint union forms a perfect soft-to-hard metal seal that closes tight without excessive effort or hammering on nut, and stays tight, regardless of wear. No leaking or lost washers. Exceptional strength and durability is proof against constant vibration, and virtually eliminates all danger of blow-offs. Cadmium plated — rust proof. Furnished with either male or female spud.

Stocked by Leading Rubber Manufacturers and Jobbers.

DIXON
VALVE & COUPLING CO.
MAIN OFFICE AND FACTORY: PHILADELPHIA
Branches: Los Angeles, Birmingham, Houston

RED HOOK HOUSES

(Continued from page 45)

used to replace standard bars of ⅜- to 1-in.-diameter. In general, the steel was cut to length at the mill and was bent on the job by ordinary methods. A total of 2,200 tons of the unique reinforcement was required for the project.

Isteg reinforcement consists of two plain round bars of ordinary structural or intermediate grade steel twisted together cold by a special machine which grips and holds the ends of the bars a fixed distance apart while stretching them into a helix. The combined twisting and stretching increases the yield point about 50 per cent (to 50,000 lb. per square inch, minimum, for structural steel and to 60,000 lb. for intermediate grade steel) and, at the same time, breaks the mill scale and automatically tests the soundness of the bars, which are stressed well above working stresses.

Concrete Delivery — Gravel concrete designed for 2,000-lb. compressive strength at 28 days is mixed and delivered to the job in 5-yd. truck mixers of the Cranford Building Materials Co., Brooklyn. Each apartment house is served by two high-speed outside hoist towers capable of handling 60 to 70 cu.yd. an hour in ½-yd. buckets. The truck mixers discharge into hoppers at the base of the towers, and the hoist buckets dump into floor hoppers from which the concrete is wheeled over wooden runways on short-leg horses.

Floor area of the buildings ranges from 6,000 to 20,000 sq.ft., an average of about 13,000 sq.ft. per building. The contractor places concrete on one or two buildings each day. Concrete slump varies from 4 to 6 in. Portable gasoline-powered flexible-shaft vibrators consolidate freshly placed concrete before it is screeded.

Each building has a set of forms consisting of ⅝-in. Douglas fir plywood and timber shores used six times from first floor to roof. Each set of forms will be used in three buildings, with necessary replacement of plywood, before the project is completed, as indicated by an accompanying progress plan.

Vacuum Process—Vacuumizing equipment rented from the Vacuum Concrete Corp., New York City, and applied to the top surface of the slab for 2½ to 4 min. removes about 1 gal. per sack of cement of excess water from the concrete and, in addition, obtains some increase in density by reducing the pressure on the upper surface while normal atmospheric pressure continues to act against the bottom. The suction to operate the system is produced by a truck-mounted Fuller dry centrifugal pump with a capacity of 350-360 c.f.m. at a vacuum of 20 in. of mercury (about 10 lb. per square inch). Suction is applied to the slab by 3x4-ft. plywood mats fitted with a fabric filter on the working face and sealed with a rubber gasket around the edges. Each vacuum mat is connected, by 1-in. rubber hose to a lightweight steel-tube manifold equipped with nipples on 2-ft. centers. Valves are provided in these lines to shut off the suction when necessary. The manifold is

(Continued on page 80)

THE TRUCK OF VALUE GMC

General Motors Trucks, powered by valve-in-head SUPER-DUTY engines with revolutionary POWER-PAK pistons, have proved absolute power leadership! And GMC trucks, with 15% to 40% proved gas savings, lead in fuel economy, too! It is entirely probable that gas and oil savings on a 1939 GMC will finally pay all of the original cost of the truck! Thousands of owner records bear witness to this statement. Wherever the new GMC's operate in cross-country travel, or do much idling in traffic, rapid recovery of the purchase price is almost sure to result! Let your GMC dealer give you final facts—they're startling!

CHECK GMC PRICES Against the 3 Lowest!

Our own YMAC Time Payment Plan assures you of lowest available rates

EXCLUSIVE GMC 2-CYCLE DIESEL FEATURES

2-cycle principle—smaller, lighter, smoother power plants!

Independent fuel injector located at each cylinder!

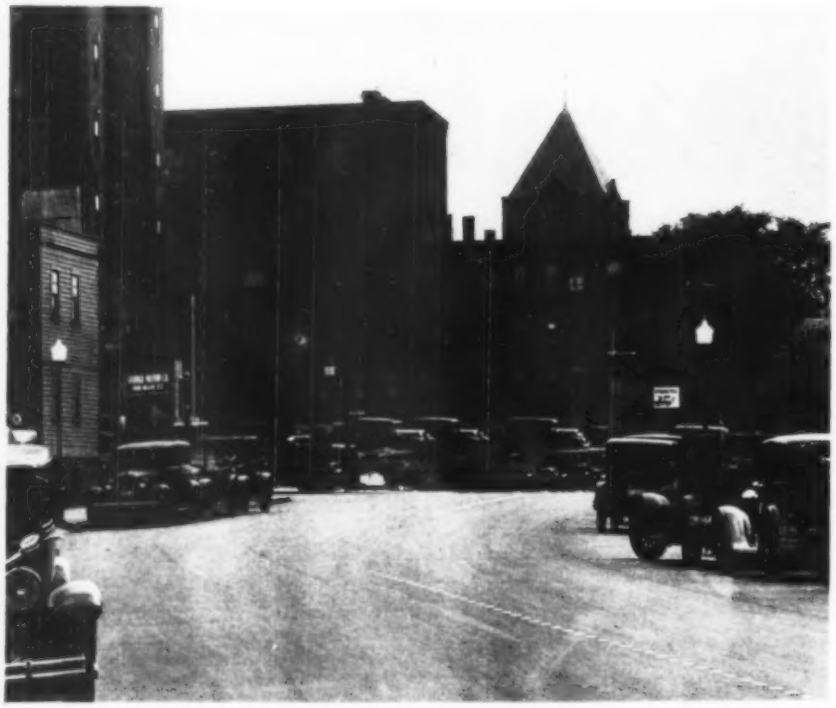
Flexibility equal to gas engine performance — lugging ability unequaled in any engine!

Longer, useful life assured by perfect engine balance, by less piston travel, by oversize bearings and all wearing parts, and by efficient cooling.

GMC TRUCKS TRAILERS - DIESELS

Laid its first Texaco Asphalt pavement 28 years ago —

and Worcester, Mass., has paved and maintained streets with Texaco practically every year since!



One of the resilient, durable TEXACO Sheet Asphalt pavements which serve Worcester, Mass.

Facts like the above concerning typical Texaco Asphalt users count more than a dozen testimonial letters!

Worcester, Mass., has been able to observe the performance of Texaco Asphalt on its streets for more than a quarter of a century. As a result, it has gained first-hand, complete knowledge of Texaco durability and Texaco economy of upkeep.

Based on these years of experience, what has been Worcester's verdict? The best answer is that during the past 10 years, this important New England city has employed Texaco Asphaltic products on its streets every year without exception.

Whether many other leading cities from the Atlantic to the Rockies agree with Worcester is apparent from the extent of their Texaco Asphalt paving —ranging anywhere from 500,000 to more than 5,000,000 square yards each.

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THE TEXAS COMPANY, *Asphalt Sales Department*
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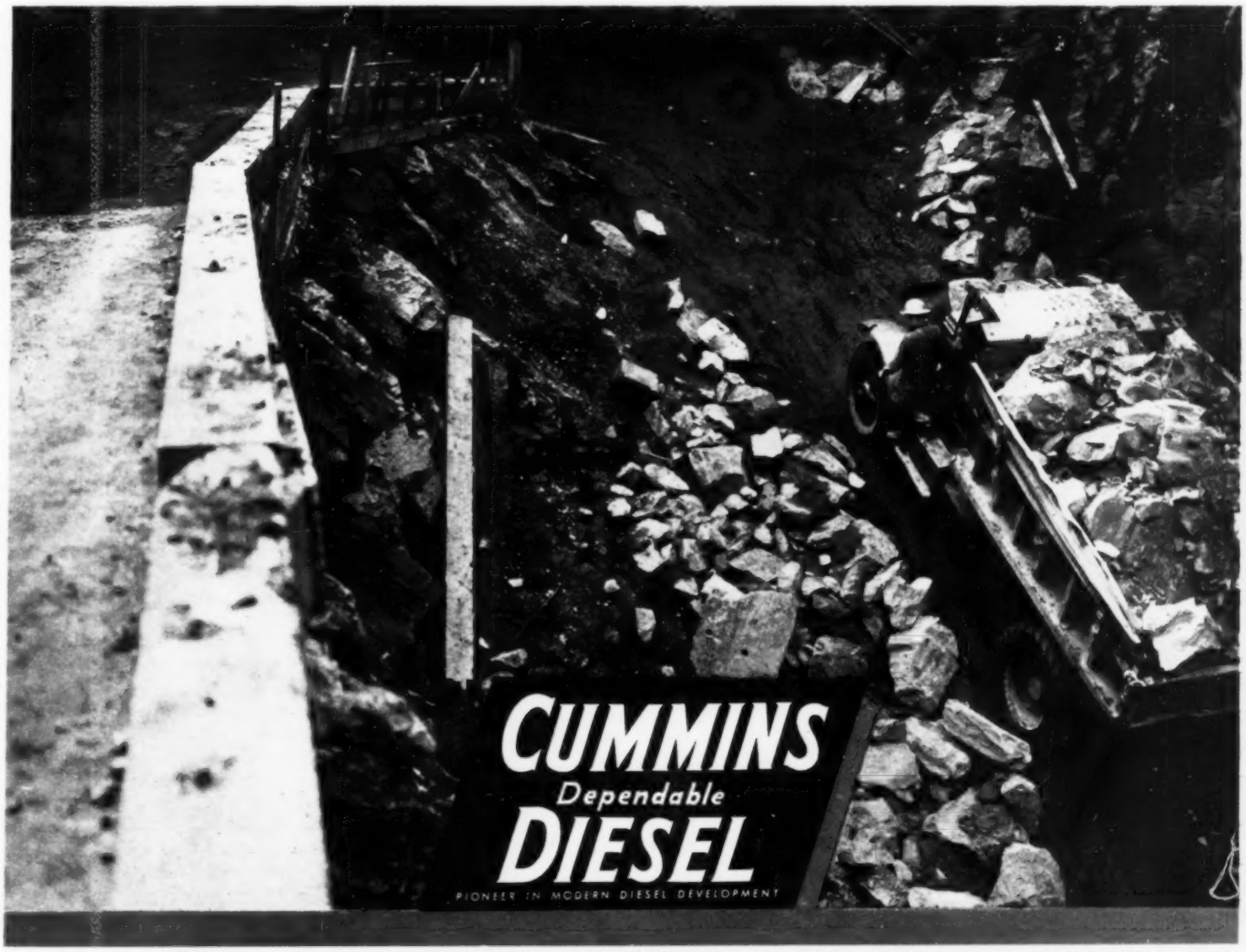
first internal combustion engines ALLOWED ON TUNNEL WORK

Because the exhaust proved to be free from poisonous carbon monoxide . . . the New York City Tunnel Authority and the State Department of Labor gave the Woodcrest Construction Company permission to use Cummins Diesel-powered trucks in the Queens Midtown Tunnel. This was the *first time* any internal combustion engine had been allowed in New York tunnel construction jobs. Cummins Diesels speeded up the job by saving an extra handling of the muck—by coming up out of the tunnel faster. In addition, Cummins dependability assured the contractor he would finish the job on time. We have prepared a bulletin giving the whole story. We'd be glad to send it to you FREE. Use the coupon. Cummins Engine Co., 1716 Wilson Street, Columbus, Indiana.



Free Bulletins for Contractors or Engineers

CUMMINS ENGINE CO., 1716 WILSON STREET, COLUMBUS, IND.

Please send me:

- ☐ Analysis of Diesel Exhaust
- ☐ Cummins Diesels in New York's Queens Midtown Tunnel

Name ..... *Position* .....

Address .....

City ..... *State* .....

(Continued from page 76)

connected by 2¼-in. reinforced vacuum hose to the pump.

A power takeoff from the truck transmission drives the pump, which is mounted with two 100-gal. tanks (for trapping water) behind the cab. The truck body is used for transporting hose lines and mats between buildings. A set of 30 mats is sufficient to take care of all needs at the Red Hook houses. The pump operates up to fourteen mats on the job, but it is capable of operating about twenty. As part of its service, the Vacuum Concrete Corp. replaces mats with reconditioned units as required, taking the used mats to its shop for cleaning and checking.

Winter Concrete — In cold weather, concrete ingredients were heated to produce a temperature of about 70 deg. F. in the mixture when it was placed in the forms. Because the vacuum process removed the excess water which was likely to cause freezing of the slab, little top-surface protection of the concrete was required. The concrete was kept warm with coke-burning salamanders on the floor below, distributed about one to each 220 sq.ft. of area. Each salamander consumed about ½ ton of coke per week. Heat was maintained until forms could be stripped, at the end of 72 hr., even during the coldest weather, with temperatures of 10 to 15 deg. above zero at night. When placing concrete at temperatures low enough to cause freezing of water on the forms, the contractor added calcium chloride to the mix to prevent this freezing. Concreting was not permitted when the weather forecast indicated probable temperatures below 20 deg. during the night.

Scaffolds and Hoists — Single-pole scaffold built to specifications of the New York State Industrial Commission, with 4x4-in. posts spaced 7½ ft. on centers, cross-braced in the end panels and anchored to the windows, surround the Red Hook buildings. Putlogs, moved up from floor to floor as the work advances, are 3x4-in. timbers to which are bolted steel clips, supplied by the Chesebro-Whitman Co., Long Island City, N. Y., fitting into the joints of the brick wall.

Each of the elevator towers serving the buildings is equipped with a Chicago boom for hoisting reinforcing steel and vacuum mats. Double-drum hoists with a single-line speed of 300 to 400 ft. per minute operate the towers and booms. The hoists are moved on skids or trucks from building to building as required.

Progress — Work began at Red Hook, July 19, 1938. Seven apartment houses are scheduled and expected to be ready for occupancy next month (June, 1939), and the remaining buildings will be completed during the fall of 1939. Thus, in an average period of slightly more than 12 months, the New York City Housing Authority and its contractors will have cleared a 40-acre site of 346 substandard residential buildings and small industrial plants, installed more than 9,000 cast-in-place concrete piles and erected 25 six-story elevator houses of 10,656 ½ rooms to shelter 2,583 families. Total cost of the project is estimated to be $12,265,000, or $1,150 per room.

Construction Contracts — A foundation contract calling for 9,236 uncased, cast-in-place 14-in.-diameter straight-shaft piles was awarded to the Poirier & McLane Corp., New York City, for $669,000. The contractor actually installed 15-in. piles, 20

(Continued on page 82)

"Never let a concrete road crack." FLEX-PLANE longitudinal and transverse crack control does control cracking when installed properly. FLEX-PLANE ribbon joint material and mechanical joint installers do it.

FLEXIBLE ROAD JOINT MACHINE CO.
WARREN, OHIO

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3-Wheel Chassis provides balanced, 3-point suspension. An extremely short turning radius, makes unit exceptionally easy to handle and steer. A new method of raising and lowering gives quick, easy positive control of broom. The frame is all steel construction . . . eliminates a considerable amount of unnecessary weight. The machine is simple, foolproof, durable and costs less to maintain. Send for Catalogs 10 and 28 . . . for complete information about the RELIANCE line of Road Building, Maintenance and Quarry Equipment.

UNIVERSAL ROAD MACHINERY CO.

Kingston, N. Y., U.S.A.

DISTRIBUTORS IN ALL PRINCIPAL CITIES OF U.S.A.

(Continued from page 80)

to 38 ft. long. For the superstructure construction, prequalified bidders were invited to offer prices on seven individual groups (of about equal dollar value) and on the entire project as a whole. Twelve bids, varying not more than 10 per cent, were submitted. The overall bid of the George A. Fuller Co. for $7,243,000 was lowest, beating out a combination bid (second low) on individual groups by less than $50,000. The contract involves almost 2,000,000 sq.ft. of reinforced-concrete slab and about 19,000,000 brick, in addition to other items in correspondingly large quantities.

Unified Inspection — To avoid the costly grief experienced by contractors on earlier housing projects financed in whole or in part by the government, Chairman Alfred Rheinstein of the New York City Housing Authority arranged for single, consolidated inspection to satisfy both the city and the U. S. Housing Authority. This unified inspection, which relieves the contractor of many uncertainties, played a part in cutting bid prices on the job.

Administration—Projects of the New York City Housing Authority are selected, designed and built under the direction of Chairman Alfred Rheinstein, who also is commissioner of the Department of Housing & Buildings. Allan S. Harrison, secretary, is in general charge of design and construction for the Authority, and construction of the projects is under the immediate supervision of John M. Johnson, construction manager. Designers responsible for planning and for detail savings in the apartment buildings were the Red Hook Project Associated Architects, Alfred Easton Poor, chief architect. At Red Hook Houses, H. E. McCormack represents the New York City Housing Authority.

Activities of the U. S. Housing Authority, Department of the Interior, are coordinated under Administrator Nathan Straus, Washington, D. C. R. E. Hall is construction advisor representing U. S. H. A. at Red Hook.

For the George A. Fuller Co., New York City, general contractor for the superstructure, F. E. Warren was general superintendent until his death April 20. Foundation piles were installed under the direction of J. W. Harter, superintendent for Poirier & McLane Corp., contractor, New York City.

"IRON MONKEY"

(Continued from page 50)

sembling these two plates to the pile, the forward end of the plate extends around the previously placed pile and grips it along its edge so that the new pile is held in definite relationship to the driven pile. In this position the new pile is hoisted to the top and when its bottom edge clears the top of the previously driven pile the crane swings laterally just enough so that, upon lowering, the pile automatically engages the driven pile. As soon as the bottom of the new pile reaches the ground level, the workmen drop out the wedges and remove the plates.

The assembly of the plates and their later re-

(Continued on page 84)

DOLLARS-LOST IN A MIST

How Shell Engineers And Shell Products Are Helping You Fight The Battle For More Efficient Industrial Lubrication

EVER hear the story of the little lost dollar—lost in an oily mist? It can be heard in power plants, mills, factories and in the engine rooms of steamships, wherever the mist of steam-cylinder oils of unsuitable grade or inferior quality is wasting dollars instead of saving them. Its message may be translated into terms of excess oil consumption, low engine efficiency, increased maintenance costs—all reflecting reduced profits. You *can* do something about these mist-bound dollars!

For instance—Shell Engineers have developed Shell Wolco Oils—a series of great steam-cylinder lubricants. They are more readily atomized yet highly stable and heat resistant. And they deposit less undesirable residue than most cylinder oils on the market! If you are interested in saving dollars in power—dollars in maintenance—get in touch with your nearest Shell office today. A Shell representative will give you the complete story of this finest of steam-cylinder lubricants.

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Insley Type K, 3/8 and 1/2 cu. yd., Excavators often remove more material per hour than excavators of larger rated capacity. They travel fast—operate fast and are easily and quickly maneuvered even in the most restricted space.

The *patented* crowd adds digging power for handling hard materials . . . makes possible easy and fast control of the dipper with larger yardage . . . cuts close to the line.

Hook roller construction prevents tipping stresses on center pin. Independent crawler control—self-cleaning crawler sprockets—full-floating shoe pins—grease impregnated bearings. Write for complete details.

INSLEY MANUFACTURING CORP.
INDIANAPOLIS, INDIANA

INSLEY

(Continued from page 82)

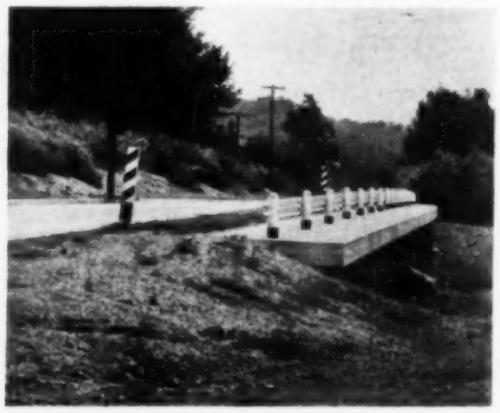
moval is a rapid operation, requiring less than a minute in each case. The two plates of the so-called "iron monkey" are sufficiently high so that there is little danger of over-traveling in raising the new piling, and, once the bottom edge has passed the top of the previous pile, the "iron monkey" maintains the proper relationship between the two piles and upon lowering the engagement of interlocks is automatically secured.

STEEL-PILE STRUCTURES

(Continued from page 51)

5-ft. centers, as indicated by the drawing, and an excavated area behind the bulkhead is filled with stone up to 18 in. maximum size. Guard rail posts are set in the concrete cap.

Construction of the project required 230 10x8-in. 33-lb. steel piles 40 ft. long. A power shovel excavated earth at the site down to a hard shale



CONCRETE CAP, forming extension of roadway shoulder, anchors guard rail posts consisting of steel casings filled with concrete. Steel casings are set on 10-ft. centers before cap is concreted.

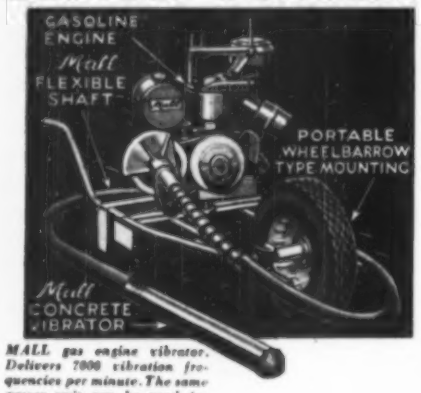
stratum overlying sandstone and limestone bed rock. Churn drills put down holes for the H-piles through the shale, which was about 8 ft. thick, and carried the drilling 12 ft. into bedrock. Piles were set in holes as soon as drilling was completed and were anchored in position by placing concrete around them.

At three natural drainage points in the length of the bulkhead, trenches running from the retaining structure to the river were cut to rock in the shale and were backfilled with stone. Derrick stone between the two pile rows was carefully placed to form a workmanlike rock wall. Behind the bulkhead, earth was removed to the centerline of the highway, and the area was backfilled with stone.

Including between 700 and 800 ft. of concrete pavement with an overall width of 22 ft., the total cost of work on this contract was about $56,000. Under a separate contract (valued at $28,744) undertaken later in the summer, the same contractor built short sections of two types of

(Continued on page 86)

MAKE EVERY JOB SHOW BIGGER PROFITS!



MALL gas engine vibrator. Delivers 7000 vibration frequencies per minute. The same power unit can be used for concrete surfacing, sawing, sanding, drilling, and pumping.

Mall vibrators save on labor and materials. At the same time they produce maximum strength, durability, and smooth uniform concrete surfaces without expensive patching.

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You'll find them
THE MOST DEPENDABLE PUMPS FOR THE LEAST MONEY
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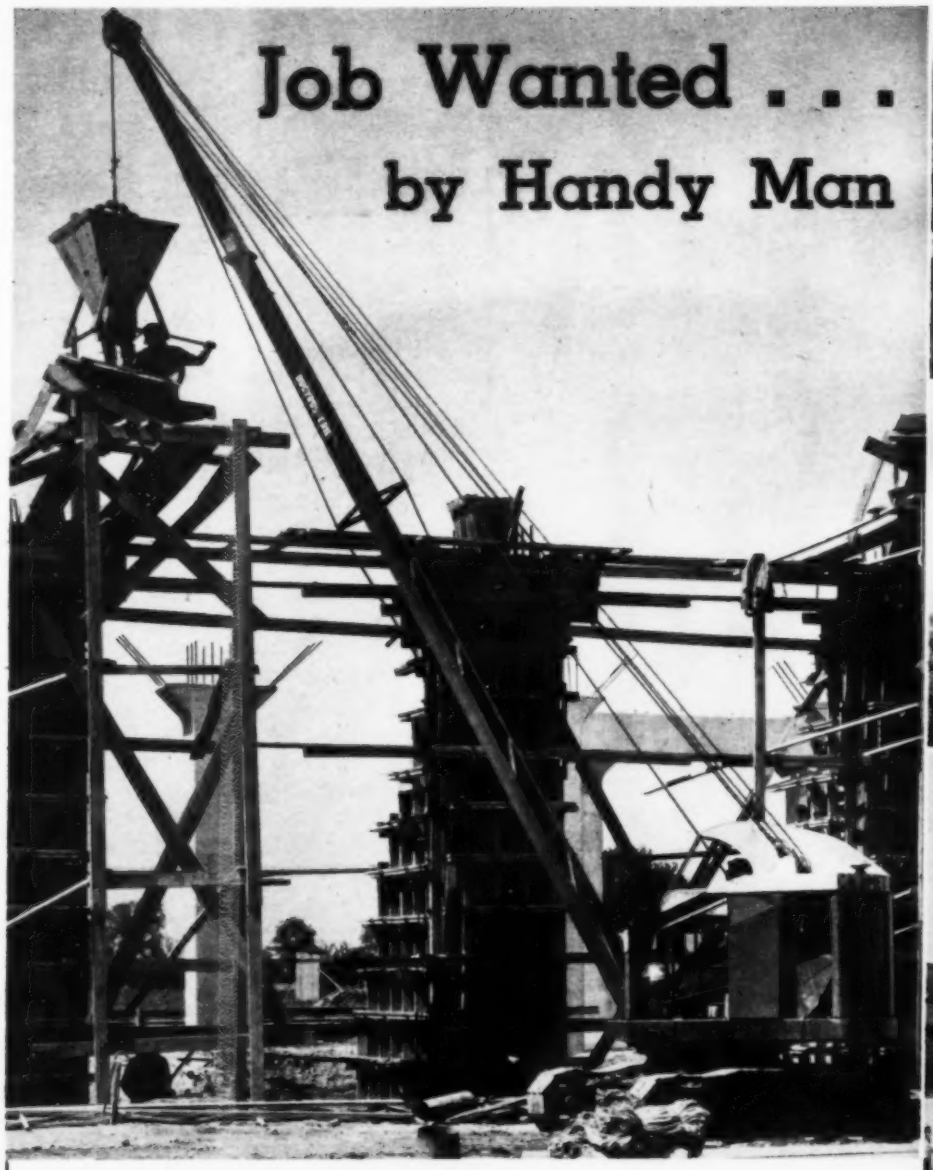
Job Wanted . . .
by Handy Man



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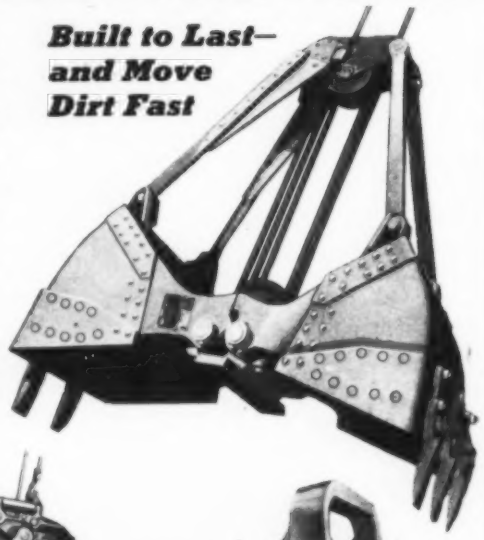

● Profits from a digging or material handling job often depend on how fast the crane operator can move dirt and materials. That's when Williams Buckets prove their advantages. Their tremendous digging power and ability to stand up do not rely on cumbersome weight and massive construction. No "dead-head" metal rides in Williams Buckets—you carry maximum yardage in every swing, utilizing the full capacity and range of your crane to move pay-dirt — not inert metal.

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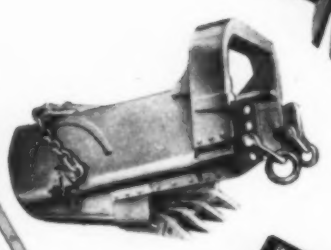
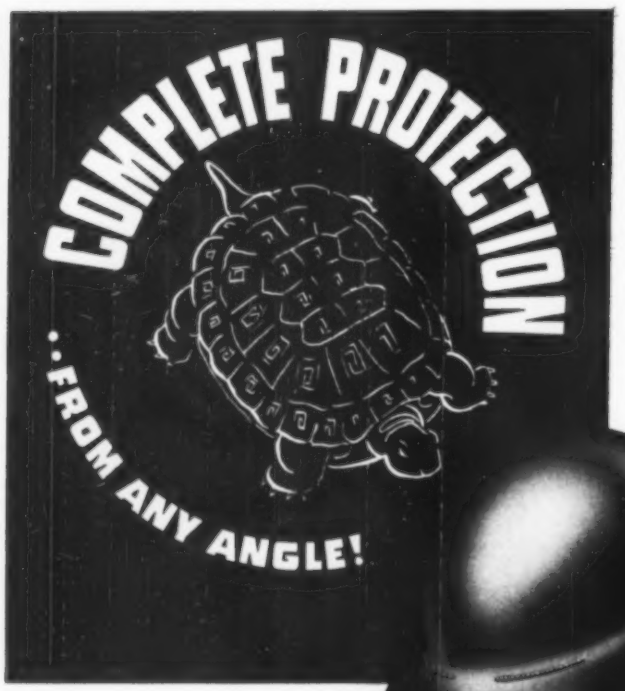


★ *Help Cranes Do Their Best Work!* ★



CONSIDER the turtle . . . *he* lives to a ripe old age, snugly protected by his armored shell against a host of dangers!

Similarly protected are the heads of the many thousands of Skullgard wearers in the construction field, who are secure against blows or bumps coming in any direction, *and at the same time enjoy the lightweight wearing comfort of an old felt hat.* That's why Skullgards (one-piece molded of *laminated bakelite*) are today's standard work-hat specification! Write for the facts in Bulletin DK-6.

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MINE SAFETY APPLIANCES CO.
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District Representatives in Principal Cities

M.S.A SKULLGARDS

(Continued from page 84)

retaining structures on State Route 77 along the Muskingum River north of Marietta. One of these structures is similar to the bulkhead already described, with the exception that the concrete cap is below roadway grade. The other Muskingum River structure is for flood protection.

Sheetpile Floodwall — In the latter structure, protecting an exposed location on the river bank where floods have eroded roadway berm in the past, a single row of steel H-piles set on 6-ft. centers and concreted 12 ft. deep into rock reinforces a line of interlocking steel sheetpiles driven to rock behind them. The job required 32 10x8-in. 33-lb. H-piles 32 ft. long. Weep holes in the steel sheetpile wall are provided by stopping the driving of every third sheet about 1 ft. above rock.

Earth behind the wall was excavated on a slope of about 1 to 1 back to the edge of the existing 18-ft. concrete pavement. Backfill consisted of 1 ft. of gravel against the sheeting, backed up by tamped earthfill in which moisture was controlled and 12-in. layers were compacted with sheepsfoot rollers to obtain 95 per cent minimum compaction required by specifications for all emergency relief jobs in Ohio.

Two truck-mounted churn drills sank the holes for the 30 H-piles at this site. All the holes had water in them, and the contractor devised a special concrete-placing cylinder, illustrated by a photograph, for lowering the concrete into the holes and releasing it under water.

Construction of the bulkheads and floodwall was carried out under the general direction of Harley E. Calvin, division engineer, Marietta, Ohio. The accompanying sketch and information for these notes were supplied by C. S. Knicely, division bridge engineer.

"GOLF-TEE" COLUMNS

(Continued from page 61)

problems created by the unusual design of the building, frequent changes in details as work progressed and impossibility of accurately estimating costs in advance, operations were handled under a cost-plus form of contract by B. E. Wiltscheck, local contractor. With a total volume of about 1,000,000 cu. ft., the structure will cost in excess of $350,000.

All reinforced concrete is made of pea gravel aggregate and 7½ sacks of high-early-strength cement per cubic yard. A 7-day strength of 5,000 lb. per square inch is obtained. The mix is delivered to all parts of the job by a concrete pump and pipe line system, although frequently, final placement within the intricate, heavily reinforced forms is by wheelbarrow. All concrete is internally vibrated.

Forms for column stems and calyxes are sectional steel units, as are also the petal rib and ring forms and column cores. For the petal slabs and the slabs filling the spaces between circular petals the forms, exceedingly complicated in many instances, are of plywood. The inside and outside courses of brick for the main walls are built up ahead of the concrete fill placed on both sides of the 3-in. central core of cork. The cork insulating slab receives a dipping of asphalt.

NON·CLOGGING SELF·CLEANING CRAWLERS

And to prove that the New Buckeye Clipper has them, you can actually shovel sand, gravel and stone into the crawler where it engages the sprockets and you can not clog the chains, crawler belts and sprockets.

Think what this feature alone means to you on stockpile work ... or on work in streams where the "wash" lodges gravel and stones in them continuously.

And remember too, you get MEVAC CONTROL only on Buckeye Clipper Excavators ... the metered vacuum control system that is never affected by temperature changes ... and works "as smooth as steam".

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Steel Monotube Pile

Supports 100-Ton Load

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One long, steel Monotube Pile can be driven to depths in high load-sustaining soil strata (filled with concrete after driving) to develop a load-supporting value of 40, 60 or even 80 tons with ample factor of safety. Compare this with the 15, 20 and 30-ton ratings for wood and all-concrete piles and you have the answer to Monotube's greater efficiency and economy. Write for catalog No. 68 today.

THE UNION METAL MANUFACTURING CO.

CANTON, OHIO

CONSTRUCTION EQUIPMENT NEWS

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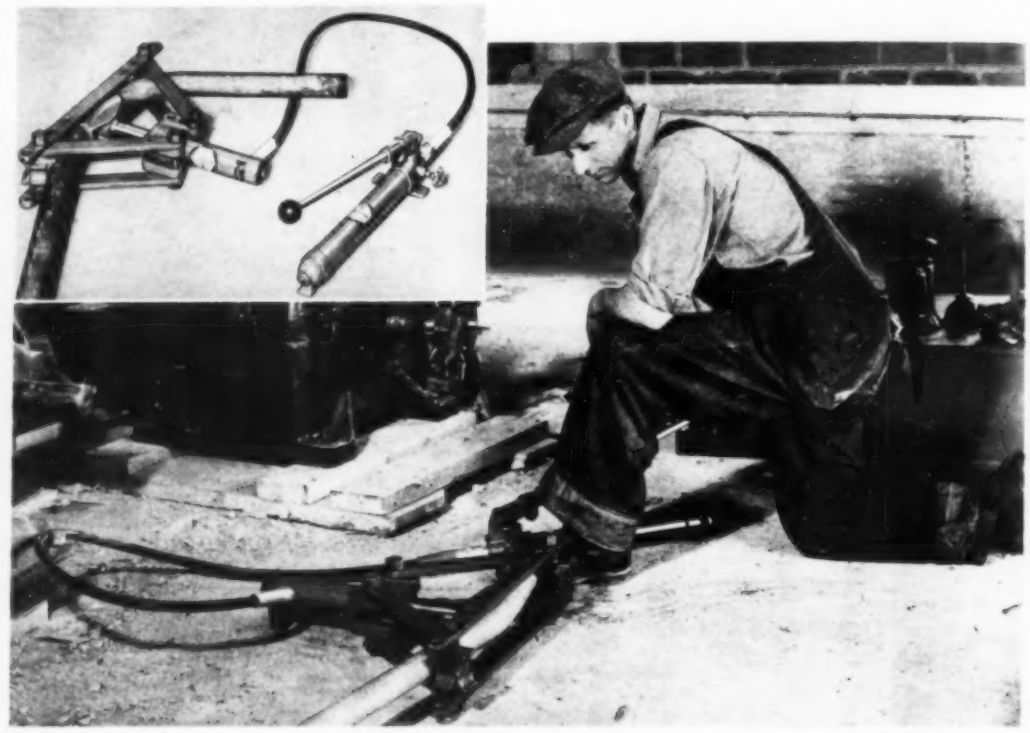
Review of Construction Machinery and Materials for **MAY, 1939**



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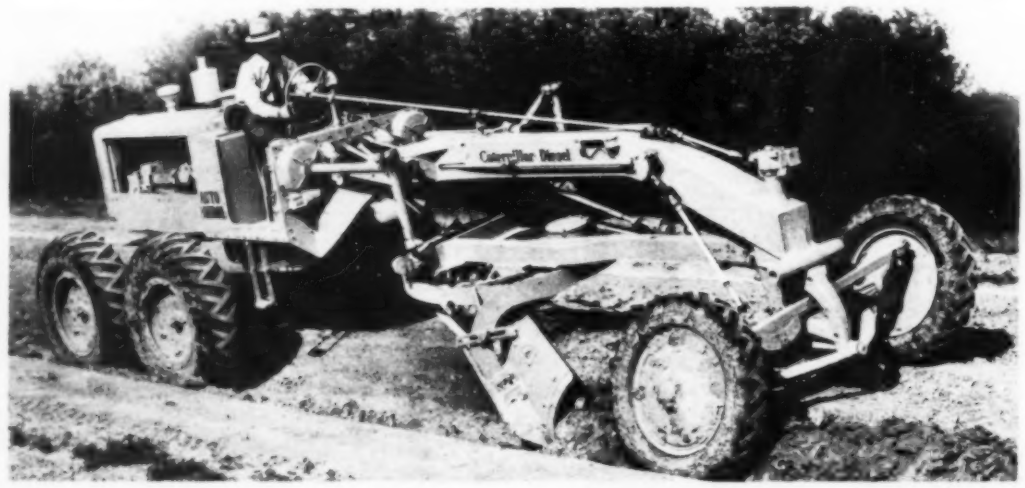

tion, shaping bad spots, working short stretches or where turning is difficult. With blade mounted in center position on blade beams, new Auto Patrol permits correct ditching position on either side, with toe of 12-ft. blade directly behind front ditch wheel and ample clearance to prevent clogging. Powered by six-cylinder, 66-hp. diesel engine mounted over driving axle. Six forward and two reverse speeds. Tandem drive and leaning front wheels are standard equipment — **Caterpillar Tractor Co., Peoria, Ill.**

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1. Maintenance of rope safety
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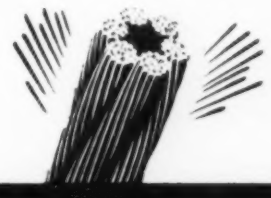
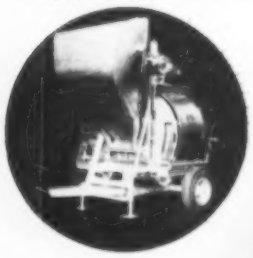
3. Less wear on drums and sheaves
4. Increased operating efficiency



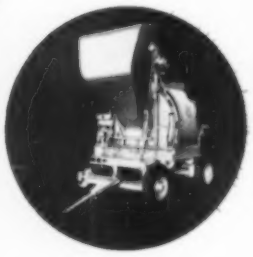
JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY BRANCHES IN PRINCIPAL CITIES

Ask about ROEBLING "BLUE CENTER" WIRE ROPE . . . *either standard or preformed*

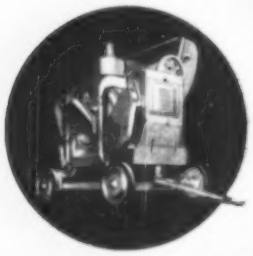
C. M. C. — AMERICA'S No. 1 EQUIPMENT LINE FOR 1939!



New CMC fast moving, high production two-wheel End Dischargers to 5s, 7s, 10s and 14s sizes.



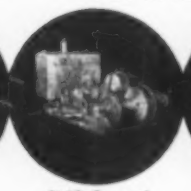
New CMC 14s, 4-Wheel End Discharger. Large output, fast, lighter weight. Also available in 7s, 10s.



New CMC 4-Wheel Side Discharger. Another big output Mixer, available in 5s, 7s, 10s and 14s sizes.

New Catalog Ready! Bigger and better than ever. Write today.

CMC Dual Prime Pumps.



CMC General Utility Hoists.

CMC Material Carts.

CONSTRUCTION MACHINERY CO.
WATERLOO, IOWA

There's Not Another Manufacturer Who Can Offer You Any One of These Exclusive Features—WITH HERCULES YOU GET THEM ALL!

1 Center-Lift, Super-Power Hydraulic Hoist.

2 "Tire-Tool" Pack Dump Bodies —a spacious weather and theft-proof compartment built-in under body.

3 "Eze-Reach" Tail Gate Control Lever — mounted on hoist frame within easy reach at all times.

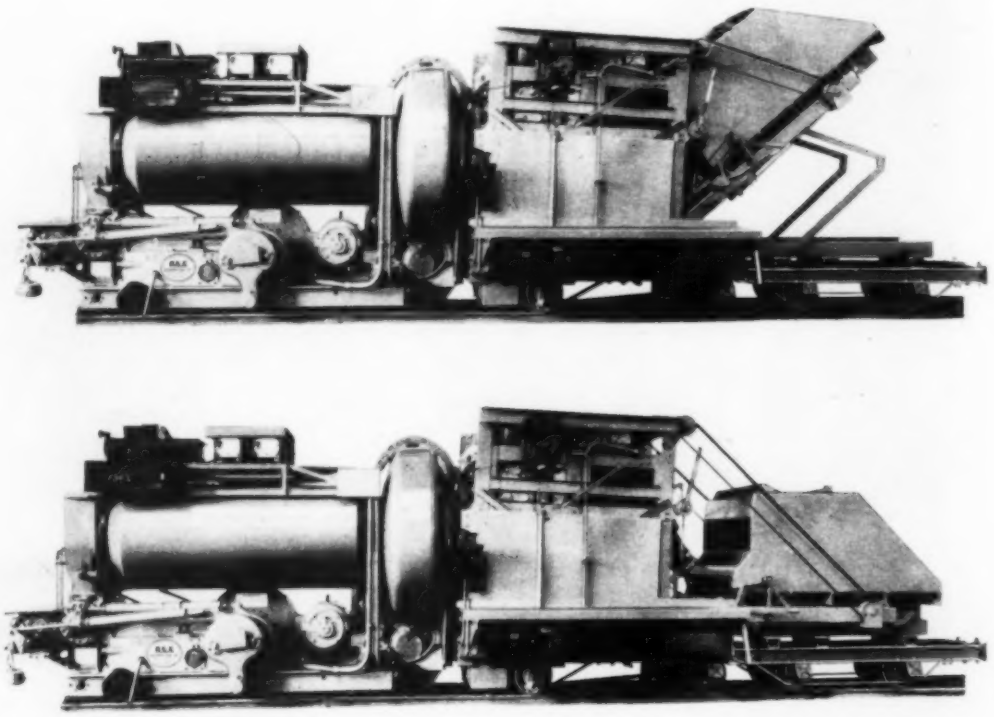
4 "Button-ease" control, on dash, operates Power Take-Off.

5 "Button-ease" control, on floor, operates Hydraulic Hoist — out of the way but handy.

Invest in the "YEARS AHEAD" HERCULES DUMP UNITS
Write for Literature!

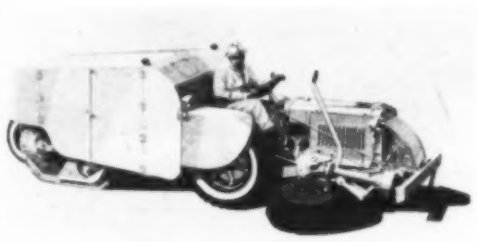
HERCULES STEEL PRODUCTS CO.
GALION, OHIO, U. S. A.

TUNNEL-LINING MACHINES adapted to work inside 12-ft. finished diameter will place 70,000 cu.yd. of concrete in 7-mi. Gunpowder Falls-Montebello tunnel of Baltimore water supply. Units are made up of two cars — a mixer car weighing about 18,000 lb. and a Pumpcrete car weighing about 16,000 lb. — designed to work close-coupled. Each car has flanged wheels and individual traction drive on 36-in.-gage track. Machine is electrically powered for d.c. operation, with all controls centralized on platform of



mixer car. Special batch cars (at extreme right) charge mixer. Batch body holding two 1¼-yd. batches is engaged by two arms from mixer car and is hoisted into charging position.

Mixer carries drum, lengthened to take 1½-yd. mix, which discharges into unique transfer drum on Pumpcrete car. Inside bulge end of this drum are closely-spaced buckets to carry concrete from mixer discharge up and on to chute which delivers inside long rotary remixer. From remixing drum concrete drops into single-chamber Pumpcrete which pumps it through arched pipe line into forms. Two complete tunnel lining units will operate independently inside tunnel, with fleet of fifteen batch cars serving each unit. Dry batches will be dropped from surface through pipes in shafts to transfer bins and batch cars. — **Chain Belt Co., Milwaukee, Wis.**



STREAMLINED MOTOR PICK-UP SWEEPER for cleaning gutters and for sweeping 6-ft. path in gutter lane. Features: (1) 36-in. floating gutter brush and 36-in.-diameter broom, both operating at slow speed; (2) positive wiper type elevator; (3) large, quick dumping, top loading dirt box; (4) larger water capacity conserved by new spray nozzle and high operating speeds. Advantages claimed: elimination of health hazards, greater safety for motor traffic and pedestrians; reduced sewer clogging and elimination of flushing costs; enhancement of property values. — **The Frank G. Hough Co., 919 N. Michigan Ave., Chicago, Ill.**

GASOLINE TRACTOR, "MODEL S", is suitable for snow-plow work, for operating 7- to 8-yd. scrapers, 12-ft. blade graders, 10-yd. wagons, bulldozers, and other auxiliary equipment. Develops 77.66 hp. on belt, 64.52 hp. at drawbar and 16,732 lb. drawbar pull in first gear. Constant mesh transmission provides five forward speeds from 1.52 to 6.37 m.p.h. and makes it possible to shift on the

go like a truck. Powered by four-cylinder, valve-in-head gasoline engine with 5¾-in. bore, 6½-in. stroke and governed speed at full load, 1,050 r.p.m. Engine has removable cylinder lining and inserted valve seats. Outstanding feature is said to be its exceptional fuel economy, tests showing fuel consumption of only 0.5 lb. per brake horsepower at 80 to 90 per cent of full load for continuous service. Offered in two tread widths: 62-in. model, weighing 18,200 lb.; and 74-in. machine, weighing 19,000 lb. — **Allis-Chalmers Mfg. Co., Milwaukee, Wis.**

Jobs like these are 27E jobs!

HERE is a typical job—short mileage, work from the slab, bring the trucks in over the slab. Such a job is a 27E job—a MultiFoote job. Such a job is easily cared for by your standard supply equipment. You do not need extra capacity at the batching plant. You do not need to make a large outlay in additional trucks. You suffer no delay penalty in getting back on the slab because of paver weight—and you have a flexible unit that will take care of any paving problem you have to meet.

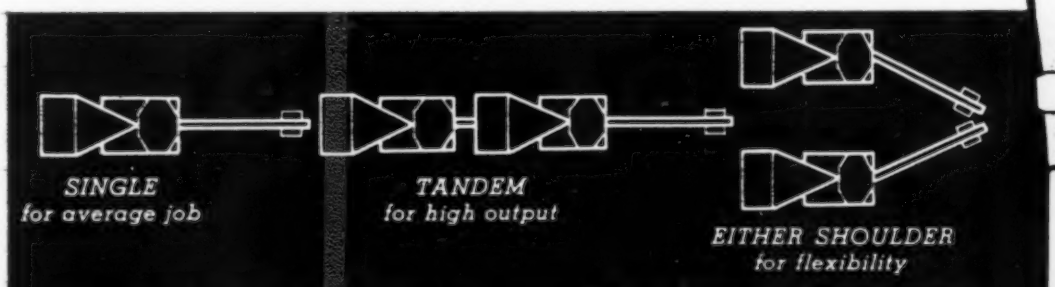
MultiFoote Pavers are geared to today's conditions. Operating in tandem, MultiFoote Pavers are capable of tremendous output. They can operate side by side or from either or both shoulders—MultiFoote 27E's give you a flexible setup that meets any contract problem without readjustment of auxiliary equipment.

Before you buy a paver—ask for details on the MultiFoote.

THE FOOTE COMPANY, INC., Nunda, New York

This Matter of Maintenance is Important!

Because weight becomes an important problem with increased size, it is far easier to build ruggedness into a 27E than into a large paver. There is no skimping of strength in parts on a MultiFoote to keep weight down. It is simple in design—all parts are accessible. Parts are available at once—and at prices far below those for larger pavers. Add to this the many features the MultiFoote brings for faster operation—a better mix with the double cone drum, a fast charge and discharge, wider boom swing, extra water capacity free from line pressure, full four point suspension—and more than enough power for the grades.



MULTIFOOTE
CONCRETE PAVERS

27E
GEARED TO TODAY'S JOBS

"SUBWAY" *is Another Word for* SAVING!

GOODALL "SUBWAY" AIR HOSE

With this dependable hose on your spades, hammers, breakers, drills, the job goes through without interruption—and you save the difference between *this* kind of performance and costly delays due to hose repairs or replacements. Its reputation for long, trouble-free service guarantees a low ultimate cost that means a *better profit* every day your air equipment is used.

The tougher the service, the more clearly "Subway" demonstrates its ability to take it, inside and out. Perfectly balanced construction insures equal life and efficiency for tube, carcass and cover, under the most severe working conditions — no failure of one part necessitating scrapping of the hose while the remainder is still good.

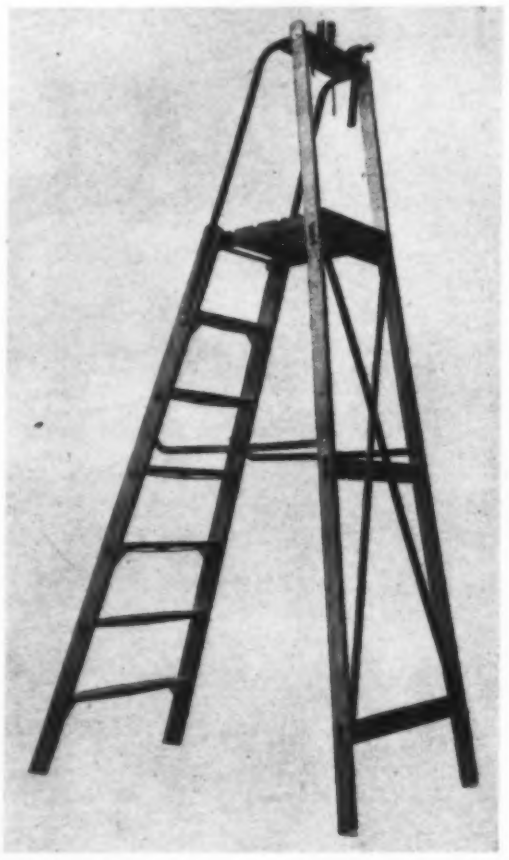
The next time you order, make it plain: "Subway — that red air hose of Goodall's." You'll quickly discover why so many contractors use those very same words!

Write for Sample and Prices.

GOODALL RUBBER CO.
5 S. 36th STREET • PHILADELPHIA, PA.
New York • Pittsburgh • Chicago • Boston • Houston
FACTORY: TRENTON, N. J.
GOODALL RUBBER CO. of CALIF.
San Francisco • Los Angeles • Seattle
Salt Lake City • Phoenix

GOODALL — The originators of the Standard of Quality Line (Reg. U. S. Pat. Off.) of contractors' rubber goods

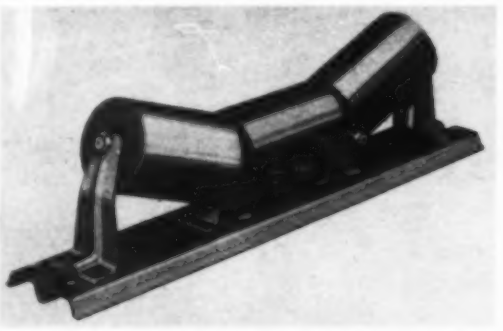
PLATFORM LADDER has following special features: (1) Band steel platform guard rails on three sides; (2) roomy, one-piece stronger working platform; (3) steps, trussed with hard wood blocks and ¼-in. cadmium plated rods, are made broader for firm



footing and comfort; (4) heavy-gage steel angle braces under alternate steps; (5) extra spread between risers and back legs for greater stability; (6) greater flare of risers and back legs eliminates rocking; (7) one-man operation; (8) hand-safe lock prevents unexpected closing; (9) hardware painted or cadmium plated to resist rust; (10) flat folding eliminates need for crating. Heights overall from 2 ft. 10 in. to 14 ft. 6½ in. — **Goshen Mfg. Co., Goshen, Ind.**

STEEL SHIM STOCK of the most frequently used thicknesses is packaged in an "economy carton" containing four 6x50-in. rolls in thicknesses of 0.001, 0.002, 0.003 and 0.005 in. Shim stock is simply pulled through slot in carton and cut off as needed, avoiding waste. Similar cartons of brass shim stock also are available. — **Laminated Shim Co., 21-44 Forty-fourth Ave., Long Island City, N. Y.**

TROUGHED ANTI-FRICTION IDLER. for belt conveyors handling materials of medium weight consisting of fines and small lumps, has idler rolls made from 4-in.-diameter smooth finished steel tubing with formed heads pressed into and welded to each end,



and fitted with ball bearings inclosed in a greaseless labyrinth. Rolls are mounted close together in reinforced steel brackets welded to steel mine-tie base, ends of which have slotted holes, permitting convenient adjustment on supporting framework. Roll shafts have slotted ends to provide positive, locked seat in roll supporting brackets. Rolls rounded and smooth to prevent injury to conveyor belt and may be removed quickly. Lightweight said to permit easy handling and erection. — **Link Belt Co., 307 N. Michigan Ave., Chicago, Ill.**

HEAVY-DUTY TRAILER is carried on six wheels, has capacity of 40,000 lb. and is completely convertible as semi-trailer, without mechanical changes of any

kind, by removing front dolly assembly. Standard size kingpin fits any regular semi-automatic fifth wheel. Other features: Deep, wide flange main beams, numerous cross members and gusset plates, spring mounted front dolly, internal expanding brakes and latest development in positive brake equalization. — **C. R. Jahn Co., 228 North LaSalle St., Chicago, Ill.**

LIGHTWEIGHT DRILL. 3/16 in., called "The Hornet," for aircraft and light industrial work is compact unit said to maintain high speed and sufficient power and stamina to perform under continuous production

service. Unique structural features have reduced size and weight (34 oz.) to minimum. Carries splined gear mounting, ball bearings, screened air inlets, an ample fan, new grip-type switch and a universal motor. Operating speed, 3,700 r.p.m. with optional speed of 5,200 r.p.m. at no extra cost. — **Black & Decker Mfg. Co., Towson, Md.**

PORTABLE ELECTRIC HOIST plugs into ordinary lamp socket and is at once available for smaller type hoisting operations where heavy equipment is too costly and impracticable. Features: (1) Light weight; (2) precision ball bearings at each rotating

point; (3) precision machined gears of heat-treated alloy steel; (4) controller, with patented "delayed reversing" feature operates easily with one hand; (5) smooth, quick acting positive, easily adjusted brake; (6) double-duty, kink-proof chain; (7) upper and lower safety stops automatically limit travel of load hook. Offered in four capacities: 250, 500, 750 and 1,000 lb., and with various lifting speeds. — **Chisholm-Moore Hoist Corp., 356 Fremont Ave., Tonowanda, N. Y.**

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LABORATORY TESTED

Which means that Macwhyte Wire Ropes, when given a "final OK" by the mill, are ready for dependable, economical service.

FIELD PROVED

...on all kinds of jobs, on all kinds of equipment, under all kinds of conditions. All year long, Macwhyte Engineers on the *job*, are constantly proving, improving, perfecting the *right* wire rope for *your* specific job.

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MACWHYTE

Whyte Strand - PREformed WIRE ROPE

MACWHYTE COMPANY
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Manufacturers of wire rope and braided wire rope slings . . New York . . Pittsburgh . . Chicago . . Ft. Worth . . Portland . . Seattle . . San Francisco . . (with distributors in all principal cities)

She **TRUSTS** her Life to

LAUGHLIN

Drop Forged Fittings

PERFORMERS on trapeze and the high wire require nerve — and perfect wire rope fittings. That's why leading acrobats insist on LAUGHLIN Drop Forged Hardware.

Less spectacular, perhaps, but equally vital to safety, is the perfect performance of wire rope fittings for the multitude of uses in construction, mining and other industrial operations. LAUGHLIN Drop Forged Clips, Shackles, Swivels, Eye Bolts, Turnbuckles, Hooks, Links and other wire rope and chain fittings have been found so trustworthy that they are the choice of experienced contractors, engineers, executives and purchasing agents everywhere.

You need this factor of safety. Protect the lives of your workmen and keep down compensation costs by specifying LAUGHLIN Drop Forged Wire Rope Fittings. You can tell them by the Triang-L Trade Mark, and by their perfect performance and long wear.

MAKE YOUR OWN TESTS.

Send for sample of patented LAUGHLIN "Safety" Clip. Grips both sides of wire — no crimping. Holds loose end of wire as tightly as live part. 95% rope efficiency by U. S. Government tests.

Also write for catalog of LAUGHLIN Wire Rope Fittings.

Quotations gladly given on special forgings to meet your requirements. Consult our Technical Service Department.

THE THOMAS LAUGHLIN COMPANY

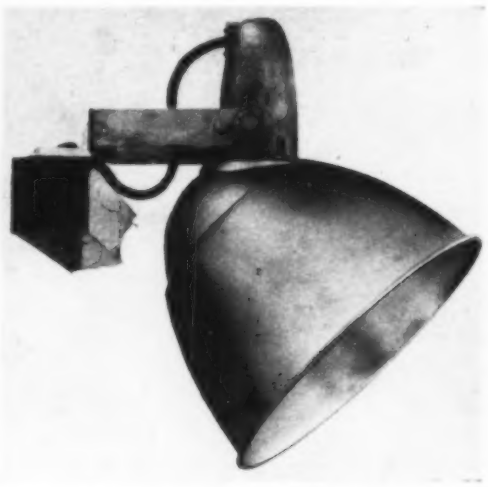
Manufacturers of Industrial and Marine Hardware Since 1800

PORTLAND, MAINE

New York* Detroit* Chicago* New Orleans Denver Seattle Los Angeles San Francisco

*Representatives

ALUMINUM FLOODLIGHT, open Alzak finish, wide beam, has been developed to meet requirements of certain athletic fields, filling stations and parking lots. Designed for use with 750-1,000-1,500-watt lamps

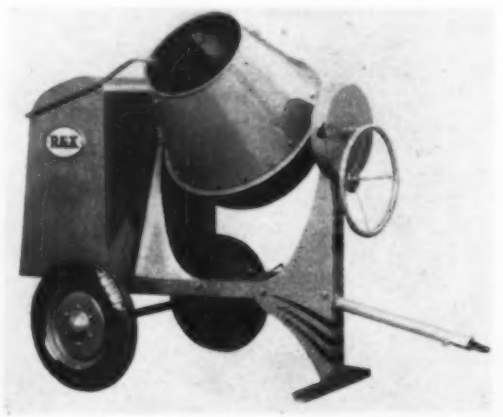


and has a beam angle of 100 deg. Wide beam angle and high reflectivity of this floodlight make it particularly suited for lighting large areas near unit. For floodlighting baseball fields and other areas farther from floodlight narrow beam floodlights should supplement this wide beam unit. — **General Electric Co., Schenectady, N. Y.**

TORQUE INDICATING WRENCH for obtaining uniform tension on bolts in turbines, pipe flanges, couplings, pumps, has heavy, ground, spring steel shaft with pointer which remains rigid. Even tension

on bolts and studs is obtained by pulling a knurled handle grip which, in turn, bends spring steel shaft. Scale, accurately calibrated from 0 to 200 ft./lb. is placed on shaft near handle grip and moves under pointer as pull is exerted on shaft. Extremely small head permits use in places normally inaccessible to other torque wrenches. Equipped with ½-in.-square adaptor and may be used with all ½-in.-square drive sockets and attachments. — **Bonney Forge & Tool Works, Allentown, Pa.**

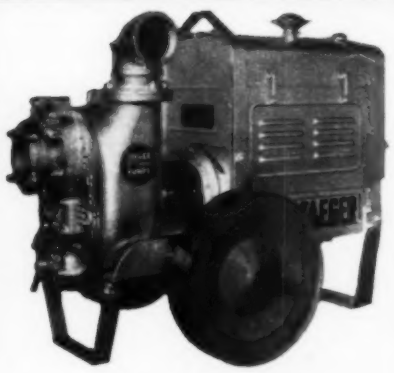
NEW LINE OF CONCRETE MIXERS streamlined for modern appearance and painted bright Persian orange for better prolonged appearance in field are available in 3½-, 5-, 7-, and 10-S sizes. Rex 5-S is made in two-wheel end discharge and four-wheel



side discharge styles and is powered by 6-hp. single cylinder air-cooled engine; 7-S in two-wheel end and four wheel side discharge powered by 1- or 4-cylinder air-cooled engine; 10-S in two- and four-wheel end discharge and four wheel side discharge powered by standard or heavy-duty 4-cylinder engine. All models furnished with solid rubber or pneumatic-tired wheels. Optional equipment: New Rex self-priming centrifugal pump and Rex batch meter. Mixers 5, 7 and 10-S have conventional type mixing drum of all-welded steel construction, high carbon steel mixing blades, drum rolls on pressed steel drum rollers, full-view one-man end controls, patented shimmy skips, Rex discharge chutes and

(Continued on page 96)

BUYING A PUMP?



INSIST ON:

- Faster, 100% Automatic Priming
- Greater Efficiency In Any Size, at Any Lift
- Thousands of Hours of Heavy Duty Service
- Cut your Costs with "Sure Prime" Pumps—1½" to 10" Sizes, Capacities 3000 to 220,000 G. P. H. Send for New Catalog and Prices.

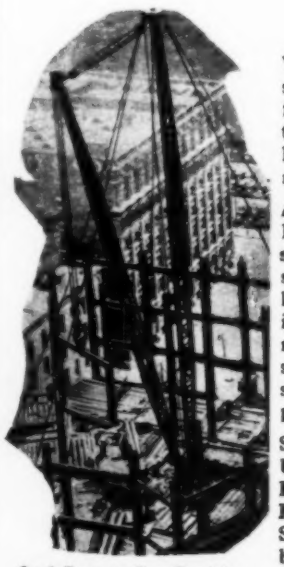
THE JAEGER MACHINE CO.
800 Dublin Ave., Columbus, Ohio

JAEGER

TRADE MARK
DOBBIE
ESTABLISHED 1867

All Steel DERRICKS

Guarantee Safety



Steel Erectors Guy Derrick, with Ball Bearing Footblock.

When you guarantee safety, you economize—for safety means uninterrupted operation and lowest possible maintenance costs.

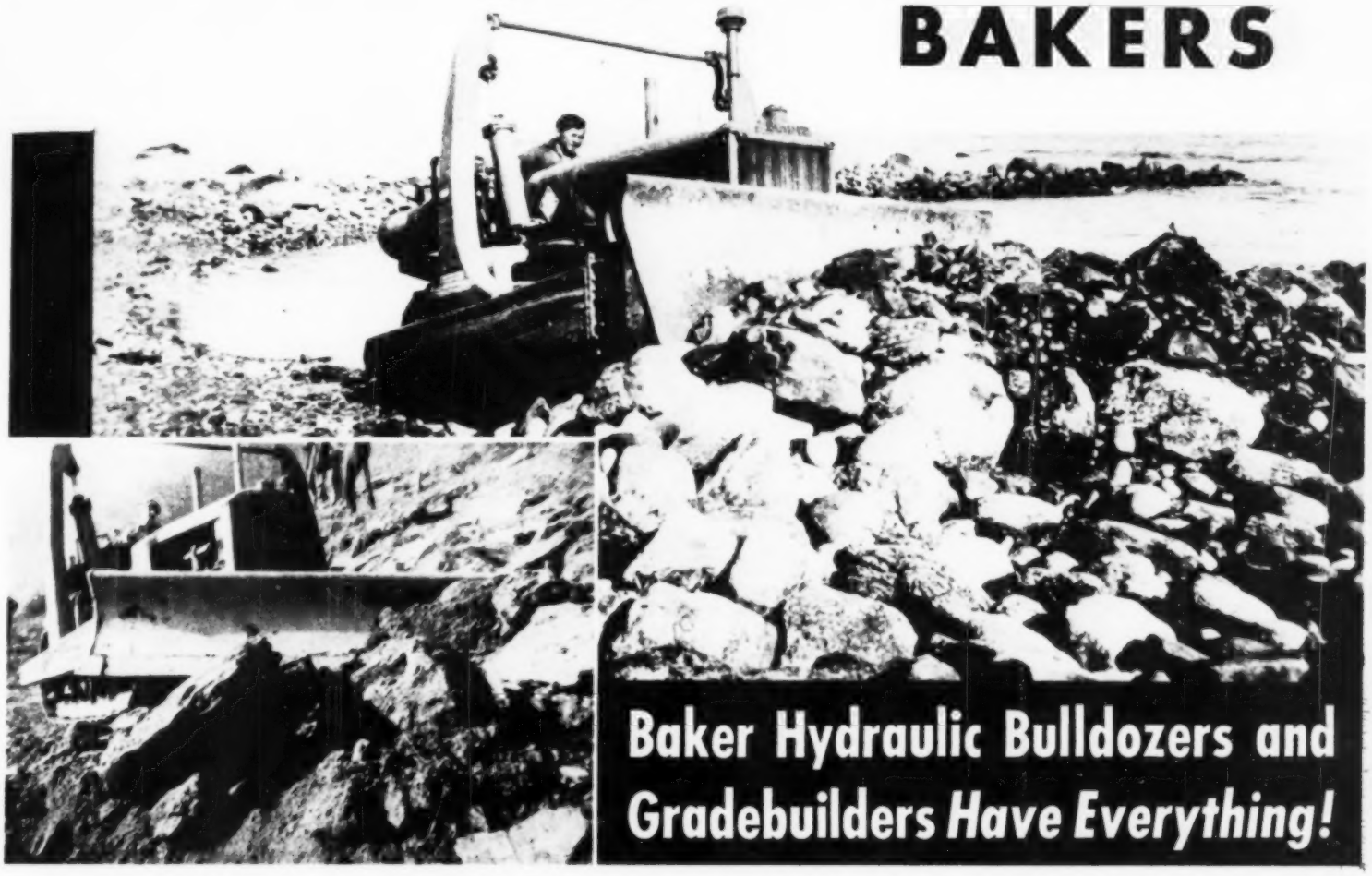
And DOBBIE All-Steel Derricks have been designed for safety and consequent economy. They have a safe load capacity of almost twice their rating. You need this assurance of dependable safety and continuous performance.

SAVE POWER BY USING BALL OR ROLLER BEARING FOOTBLOCKS AND SHEAVES. Built in both Guy and Stiff-leg types. Write for information and prices.

Dobbie Foundry & Machine Co.
Niagara Falls, N. Y.

Other Dobbie Products—Steel Derricks, Timber Derrick Fittings, Hand Winches, Motor Driven Winches, Blocks, Sheaves, etc.

Better Bulldozing with BAKERS



Baker Hydraulic Bulldozers and Gradebuilders *Have Everything!*

ABOVE. Remember the big hurricane in New England last September? Here's a Baker Bulldozer on an Allis-Chalmers "K" tractor clearing rocks off Port Judith Beach, R. I., after the storm. The owner says he has had the Bulldozer two years — and no repairs yet.

BELOW. Here's a Baker Gradebuilder on an Allis-Chalmers tractor tearing into a mountain side, building a new trail. Things have to move, and move fast, with a Baker.

- Direct hydraulic lift — no gears, levers, cranks or springs.
- Few wearing parts, due to simplicity of construction.
- Tremendous down pressure when you need it.
- Patented twin cylinders keep moldboard level on rough ground.
- Balanced load on track prevents injury to tractor.
- Accurate blade control through a most effective hydraulic system.

All these features combined with built-in strength for your toughest jobs assure you the dependable, trouble-free performance that is essential for worth while profits.

Ask for latest bulletins on Baker Bulldozers and Gradebuilders — also on Hydraulic Scrapers and other Baker products.

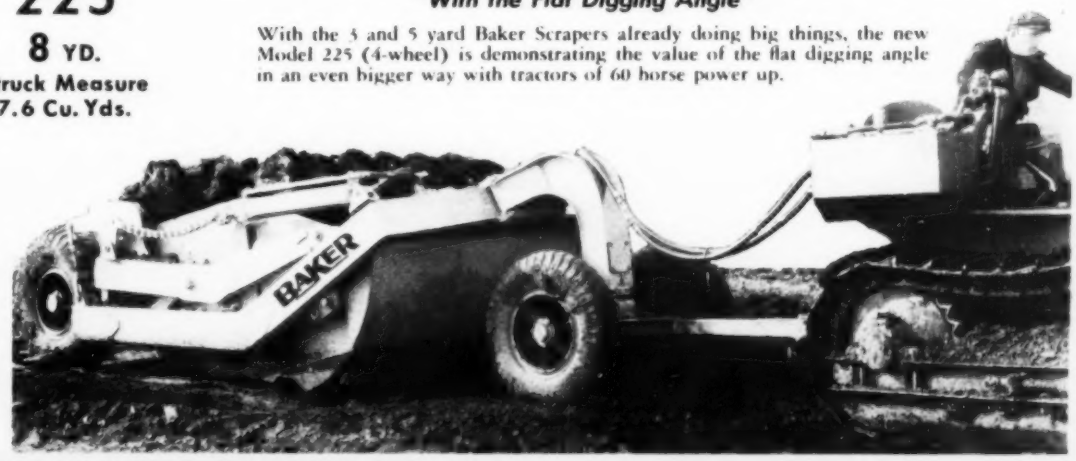
THE BAKER MFG. CO.
568 Stanford Ave.
SPRINGFIELD, ILLINOIS

MODEL
225
8 YD.
Struck Measure
7.6 Cu. Yds.

THE LATEST BAKER HYDRAULIC SCRAPER

"With the Flat Digging Angle"

With the 3 and 5 yard Baker Scrapers already doing big things, the new Model 225 (4-wheel) is demonstrating the value of the flat digging angle in an even bigger way with tractors of 60 horse power up.



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BULLDOZERS • GRADEBUILDERS • SCRAPERS • ROOTERS • ROAD DISCS • MAINTAINERS • SNOW PLOWS

For high-speed material handling

AMERICAN
STEEL DERRICKS
5 to 250 Tons Capacity

AMERICAN 50 Ton Steel Stiffleg Derrick placing concrete aqueduct pipe 12 feet 8 inches in diameter and 12 feet long.

Present-day high-speed material handling calls for the absolute "tops" in derrick design and construction. The AMERICAN Line contains derricks built to meet every requirement — stiffleg, guy, self-supporting, tower, and barge types. Each is thoroughly engineered — designed and built to meet the exacting demands of present-day high-speed material handling.

The Genuine CROSBY CLIP

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SAINT PAUL, MINN.

AMERICAN TERRY DERRICK COMPANY
SOUTH KEARNY, N. J.
Branch Offices
NEW YORK and CHICAGO

(Continued from page 94)

new Rex water tanks with "Non-By-Pass" valve which measures water exactly and is said to make dribble impossible. Driven by all-steel Rex Chabelco chains with case hardened pins and bushings, heat treated rollers and side bars. — **Chain Belt Co., Milwaukee, Wis.**

TILTING-TYPE INDUSTRIAL TRAILER tilts for loading and can be towed behind motor car, truck or tractor. Platform serves as loading ramp, thus eliminating need of using jacks, blocks or skids. Ma-

chines can be driven on to trailer under own power, or equipment can be loaded with aid of hand-operated winch. Patented double drawbar permits tilting of trailer without uncoupling. In transit this drawbar is securely locked. Equipped with Timken roller bearing axles that move independently in vertical, channel-shaped sliding guides. Multiple coil suspensions take up road shocks and prevent side sway. Trailer available in five sizes ranging up to 10-tons capacity, with either standard or recessed platforms of various widths and lengths to suit conditions. — **Meili-Blumberg Corp., New Holstein, Wis.**

Odgen Avenue Viaduct

(Continued from page 59)

er and white concrete curb specified for the entire project. Precast units for both traffic stripe and curb were supplied by the Massey Concrete Products Co. The permanent traffic stripe consisted of short lengths of precast black concrete plank, 5¼ in. wide by 1¼ in. deep, made up from a mixture of one part by weight of Lumnite cement and three parts of hard black granite aggregate. The concrete mixture for the precast curb units contained one part by weight of white cement, one part of Ottawa sand and three parts of hard white marble aggregate.

A center-line groove to receive the black traffic marker was formed in the surface of the pavement slab by boards supported from the deck forms. The boards were lifted and the precast markers were set in the concrete while it was still soft. Special steel chairs supported the precast white curb, which was protected by an application of cold water paint against staining by pavement concrete splashed on it. The splashings were easily washed off the white curb after paving had been completed.

Administration — For the Division of Highways of the Illinois Department of Public Works and Buildings, Ernst Lieberman is chief highway engineer, and C. M. Hathaway is construction engineer. The Ogden Ave. viaduct is being built under the direction of the Chicago district office, Kendrick Harger, district engineer, and R. M. Dillon, district construction engineer. Construction of the viaduct is under the immediate direction of K. L. Brown, resident engineer. K. A. Johnsen is supervising engineer in general charge of the viaduct and several other projects.

For the Thomas McQueen Co., Forest Park, Ill., substructure contractor, operations were directed by P. W. Joy, superintendent.

Selling Construction Service — Dingman
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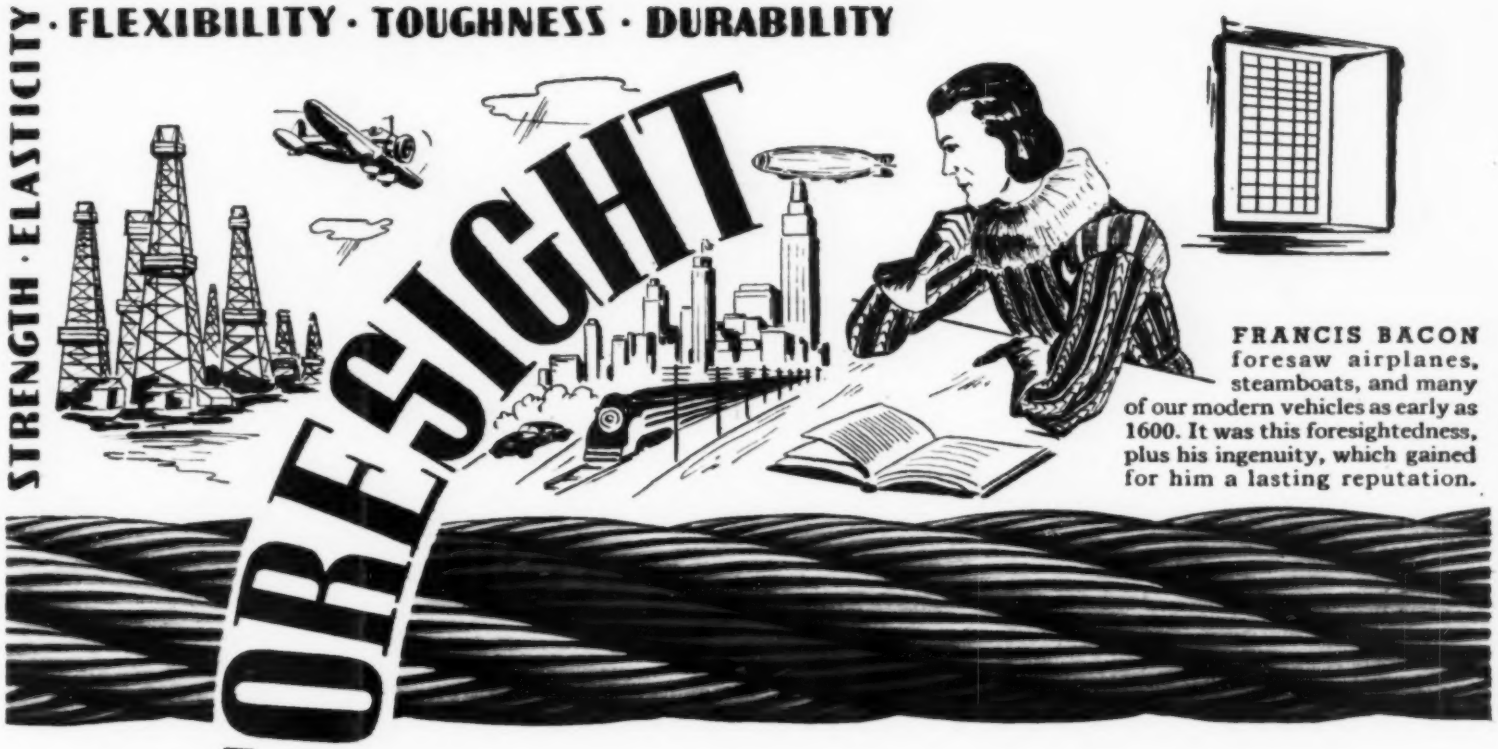

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CONSTRUCTION EQUIPMENT NEWS

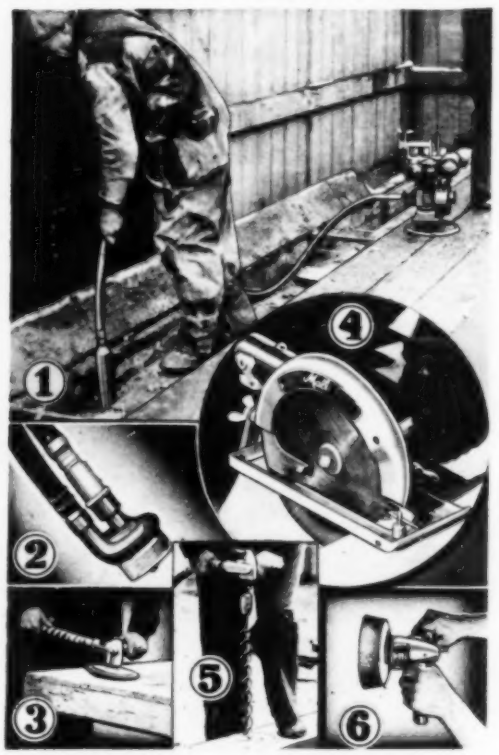
Continued

80-TON TRAILER-TRUCK. 10½ ft. wide, 10 ft. high and 25 ft. long, is designed for use in mining, lumber and logging operations, and in other industries which use trucks of large capacity. Weight of chassis 35,000 lb. Combined weight of chassis, trailer and load in excess of 112 tons. Powered by two 6-cylinder

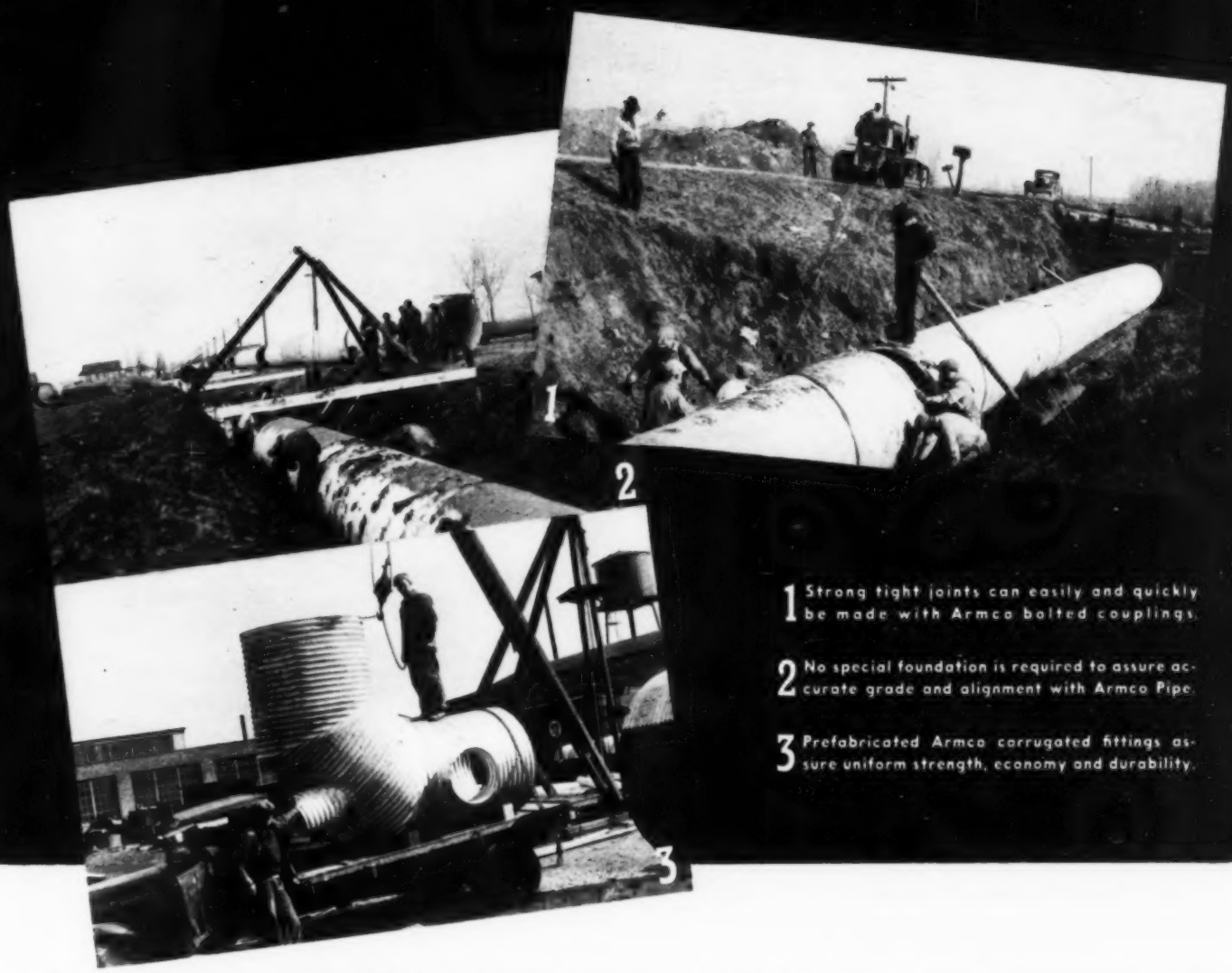
Hercules gasoline 5¾x6-in. engines equipped to operate with butane for fuel. Attached to each engine is large General Electric generator which drives 125-hp. motor, and each electric motor drives one of the tandem rear axles. With no mechanical connection between engine and driving wheels, starting and stopping are said to be exceptionally smooth. Shift lever for forward and reverse only. Speed limited to 32 m.p.h., is controlled by foot accelerator. Forty-ton units powered by single Hercules 5¾x6-in. engine driving through an 8-speed transmission. — **Dart Truck Co., Kansas City, Mo.**

ELECTRIC SAWS in portable and table models for inside and outside work are said to be only machines of their class that cut at any desired angle either to right or left as well as at any angle from the vertical. Features: (1) Center suspended track; (2) moveable table; (3) large motor models have renewable tool steel ball races, located outside for easy cleaning; (4) small motor models have felt lined sliding gib track on outside — also for easy cleaning. Master square-frame motors. Mandrel locked to motor shaft. All controls in convenient positions. Track and motor locks hold so securely that no auxiliary locks are necessary. Both dials in plain sight. Three models: light-duty, portable, slide table; heavy-duty-slide table-ball bearing track; heavy duty-screw feed table-ball bearing track.— **Red Star Products, Inc., 12910 Taft Ave., Cleveland.**

PORTABLE GAS ENGINE UNIT. 1hp., delivers power directly to working tool by heavy-duty flexible shafting, no electric wires, generator sets, nor air compressors being needed to operate it. Has attachments for concrete vibrating and surfacing for sawing, drilling, grinding, wire brushing, form sanding and pumping. Said to be unusually light in weight, powerful and portable — can be carried up ladder by one man and placed on scaffold or in close quarters. Can also be operated when suspended from rope or hook. Insets in photograph show various attachments in use: (1) vibrating; (2) pumping; (3) sanding; (4) sawing; (5) drilling; (6) surfacing — **Mall Tool Co., 7740 S. Chicago Ave., Chicago, Ill.**



MAKE MORE MONEY EASIER
on Drainage and Sewerage Jobs



1 Strong tight joints can easily and quickly be made with Armco bolted couplings.

2 No special foundation is required to assure accurate grade and alignment with Armco Pipe.

3 Prefabricated Armco corrugated fittings assure uniform strength, economy and durability.

It is reassuring to know that on difficult drainage and sewerage jobs you can speed the work and avoid costly delays with Armco Pipe. What's more, it actually saves you money in these ways . . .

Armco Corrugated Pipe combines ample strength with light weight. In 20-foot lengths it is easily handled with greater safety. Transportation costs are low. Longer lengths mean fewer joints, less assembly work. Strong, tight connections can be made under any weather condition by unskilled labor. And with Armco Pipe the work goes smoothly, with no time out for replacing broken sections.

Another big saving is seen in preparatory work. Armco Pipe takes a narrower trench because of its lighter wall thickness. There's less earth to move and no extra digging for bell or mortared joints. You get accurate grade and alignment simply by laying Armco Pipe on a uniform foundation—no special bedding is needed, no cradle or piling.

Let Armco Pipe help you reduce overhead; keep the job moving on schedule; and bring an efficient profitable installation. An Armco man will be glad to assist. See him before bidding on that next drainage or sewer job. Or write us direct. Armco Culvert Mfrs. Assn., Middletown, Ohio.

ARMCO ARMCO **CORRUGATED METAL PIPE**

PLAIN GALVANIZED OR BITUMINOUS PAVED AND COATED

Speed-o-Matic

SHOVEL - DRAGLINE - CRANE

"The Performance of this Machine has Amazed Other Operators in this Section"

So says Sam Monnie, Supt. of Workings of the Culgun Coal Co., Amsterdam, Ohio, whose Link-Belt K-45 Speed-o-Matic shovel is shown removing overburden on a coal stripping operation. Other operators in the vicinity have come to see at first hand the great amount of yardage this machine handles. It is a 1¾-yd. shovel, equipped with a 34-ft. boom and 26-ft. dipper stick.

After inspecting and testing many other types of shovels, Culgun selected Speed-o-Matic because of its ability to remove more dirt per unit-cost—to maintain a steady, fast-pace all through the work shift. 22 hours a day service for over 13 months, has confirmed their judgement.

"I Can Keep Up a Steady Pace of 2 Passes a Minute with this Speed-o-Matic. After an 11-hour shift, I can go out in the evening without feeling tired. I have been working on shovels for the past 12 years and believe the Speed-o-Matic is by far the easiest to operate. Moving those small handles is much easier than tugging on the levers of other machines."—W. H. (Bill) Compton, Operator, Culgun Coal Co.

Get the facts about Speed-o-Matic. Write today.

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WHO is better qualified to judge a product than its user?

This holds true with a bucket and the crane operator—the man who digs with one.

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• Only Modern SKILSAW has the power and speed and ease of operation you have a right to expect when you buy a portable electric handsaw — 19 years of constant improvement have made SKILSAW (the original electric handsaw!) THE BEST on the market today!

Test Modern SKILSAW on your toughest sawing jobs and you'll see why it is *more for your money!* SKILSAW out-performs all others under heaviest loads—it saws faster, easier, deeper on any kind of job. It is lighter, better balanced, more convenient to handle. It is engineered to give you many years of trouble-free service. No other saw can give you all of these profit-making features.

Buy a genuine SKILSAW now and you'll be money ahead on every job this season!

9 powerful models for wood, metal, stone and composition.

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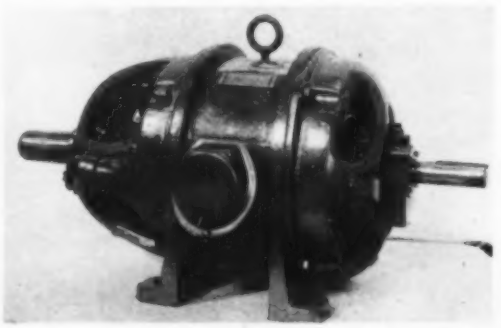
INDUSTRIAL LOCOMOTIVE LINE, Ford powered, has been extended in size and weight to make possible use of new Ford 95-hp. engine, in addition to former 85-hp. Ford V-8. Equipped with all-speed reverse which makes all forward speeds available

in either direction, and dual-spring journal suspension which assures higher speeds over poor track. Built with indestructible steel frames. Complete power plant is made by Ford Motor Co. and can be serviced at any authorized Ford service station. For use in localities where gasoline is relatively expensive. Buda-Lanova or Hercules diesel engines may be substituted. Larger models are furnished with Caterpillar gasoline and diesel engines. — **Brookville Locomotive Co., Brookville, Pa.**

HOIST AND CRANE MOTORS, designed to meet exacting requirements of such applications as cranes, hoists, coke pushers lorry cars, turntables, steel-mill auxiliaries, bascule, lift and swing bridges and rotary car dumpers, are rated for intermittent service and have 275 per cent or more pull-out

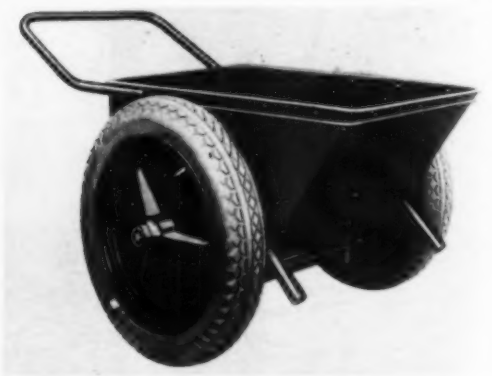


torque and a starting torque of approximately 90 per cent of this value. Good for 50 per cent overspeed and plugging at full speed. Low-inertia rotors reduce power consumption and minimize brake wear. Sealed sleeve bearings seal dust, grit and dirt out, seal clean oil in and maintain perfect lubrication. Motors thoroughly insulated with taped end-turns which resist moisture, oil dust and mild chemicals. Interchangeable ball or roller bearings. Overflow sump prevents over greasing and makes unnecessary dismantling of bearings to remove old grease. — **Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.**

JACK SYSTEM, consisting of Rollaway jack and from one to ten Rollaway Re-Nu-Top skid platforms, is said to put mechanical materials handling within reach even of smallest plant. Jack is streamlined and mounted on rubber-tired wheels revolving on Hyatt roller bearings set on high carbon steel axle. Narrowest steel tread available reduces tendency of

handle whip. All engaging members of heat-treated alloy steel. "Safeti-Sure" balanced-type handle with equalizing spring inclosed inside tube, which prevents handle from falling to ground when platform is elevated. Wide open prong pocket set in front of hole to guide connecting skid platform keeps handle at proper angle for easiest insertion when connecting with platform which may be accomplished with one hand. Locking is automatic. Skid platform is mounted on Hyatt roller bearings and set on high carbon steel axles for easy rolling. — **Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.**

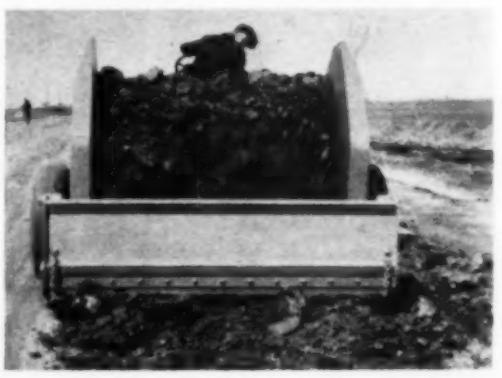
PNEUMATIC-TIRED HEAVY-DUTY CONCRETE CART in two sizes, 6 and 9 cu.ft., has these outstanding features: Heavy pipe axle with Timken bearings;



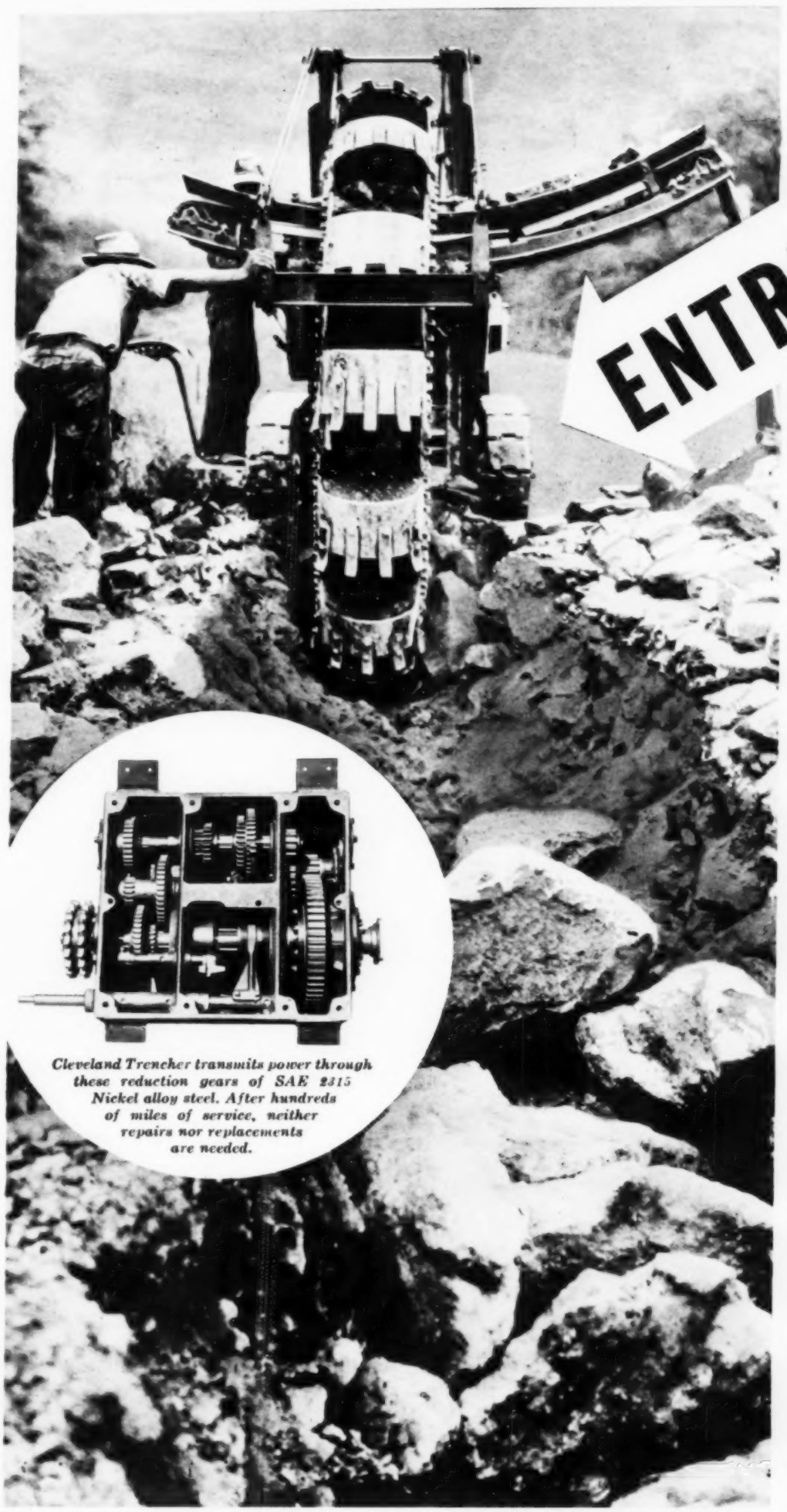
sealed wheel hubs and eye bolt for tow hook; front legs for clean dumping; smooth, lap-welded, watertight hopper; standard 4.00x18-in. straight side tires; disk wheels. Said to be easy to wheel and record breaker for material moving — **Red Star Products, Inc., Cleveland, Ohio.**

DUMP WAGON, 2-yd. capacity hydraulic power-controlled unit, for use behind pneumatic wheel or track-type tractors, was designed for clearing road slides, for state and county maintenance work, for

use in mines, gravel pits and other places where equipment must operate in close quarters. Bucket has flat loading position for picking up sand or windrowed earth. Shoes supplied to fasten on blade when picking up silt and debris. Special features: (1) Spring actuated front gate opens automatically



as blade lowers into cutting position, providing maximum clearance for loading; (2) low loading position and variable carrying positions controlled by operator; (3) smooth cutting edge — adjustable from 0 to 6 in.; (4) open top permits shovel loading; (5) position of wheel center back of dumping allows unusual cast over bank; (6) eccentric spindle plates permit independent vertical adjustment of wheels for cutting on slope. — **Be-Ge Manufacturing Co., Gilroy, Calif.**



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Cleveland Trencher transmits power through these reduction gears of SAE 2315 Nickel alloy steel. After hundreds of miles of service, neither repairs nor replacements are needed.

How often have you seen the profits of a carefully figured job buried in difficult small trenches? How different with a "Baby Digger" on the job. The powerful jaws of this unique Cleveland Trencher—from 10½" to 23½" wide—rapidly and economically eat their way down through 5½ feet of sharp sand, hard clay, hardpan and rocks.

Cleveland Trencher engineers rely upon Nickel alloy steels to increase strength and dependability—decrease bulk and deadweight. Their gears and reduction units, forged from SAE 2315 Nickel steel, have set enviable service records during the past 15 years. Even stressed studs and bolts are made from SAE 3140 Nickel alloy steel to assure every Cleveland's "continuity of performance."

Dig out from under needlessly high costs. Specify new or replacement equipment strengthened and toughened with Nickel. Nickel, alloyed into irons and steels, helps each ounce, each inch of metal do more work at lower cost per year. For specific information about money-saving applications of Nickel, please write to:

Cleveland-Baby Digger Model 95 trenching through rocky ground. To withstand shock, stress and wear, Nickel alloy steels are used from crawler treads to cutter teeth.

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11 MODELS IN FOUR SIZES

TWO 3/8 YD. MODELS
Bearcat Jr. . . . 15,000 lbs.
Model 55 . . . 25,000 lbs.

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Model 75 . . . 32,000 lbs.

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ALSO FOUR TRUCK CRANES AND SHOVELS
Gas or Diesel Power

He's not so hot on the race track

BUT HOW HE WHEELS THAT TRUCK

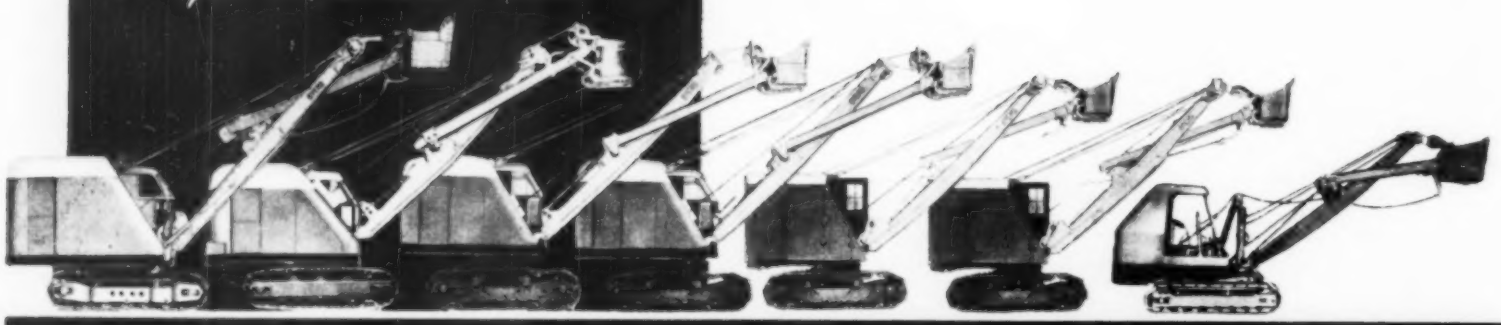
● Your dump truck drivers might turn in a good performance behind the wheel of a racing car, but they specialize in handling dump trucks. On any job under any haul conditions you can depend on your *best* men to get there and back safely, surely and in the shortest time. They *know* their trucks.

Like them, The Byers Machine Co. *know* portable shovels and cranes, for, Byers also specializes. Byers builds only 3/8, 1/2, 5/8 and 3/4 yard sizes of shovels and cranes. But in these four sizes they have 11 models from which you can choose.

Instead of offering you *one* model in any one size, Byers can give you several—a range of models, prices, capacities, front end attachments and features.

Here you are sure to find just the machine to suit your particular requirements. A nation wide group of responsible, trained, serviceable equipment distributors are able to give you complete information.

Why not inquire today for quotations and up-to-date data on any portable size of shovel or crane you may need.



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THE BYERS MACHINE CO., RAVENNA, O.
Distributors throughout the World

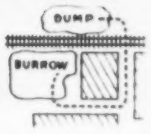
SPECIALIZING IN
3/8 · 1/2 · 5/8 · 3/4 YD. MODELS

Shall it be...

Lighter Loads?
Longer Hauls?
Wider Turns?
More Expense?

or

THE CLETRAC TWO-TRACK POWER TURN?

When a job shows bad ground, **tough grades** **or awkward layout,** 

Cletrac's TWO-TRACK POWER TURN **with its ability to pull on shorter turns and on greater grades enables you to make your contract pay out "as figgered."**

With Controlled Differential Steering Cletracs pull on both tracks when turning.

Maneuvering in close quarters is easy with Cletracs two-track power turn.

Even under the most unfavorable conditions, Cletrac's power and traction handle big loads.

● Without Cletrac's two-track power turn you can either haul lighter loads, take a wider arc turn to hold your power and traction or make a long haul-around —at *extra expense* and *added job time*. The profit-making answer in any case is *Cletrac with both tracks pulling on the turn* as well as on the straightaway.

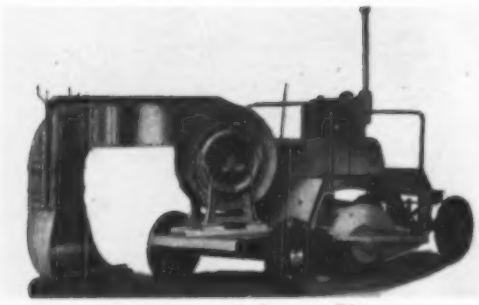
With Cletrac you always have double track power when you need it most and a soil gripping crawler track that puts the power pull into the pay-load. *Controlled Differential Steering* is the engineering term for this feature. What it means to the contractor is great all around power, nimble maneuverability and a decidedly lower cost for every haul.

Not exactly a Water Bug, but Cletracs are light weight. They have no *excess* weight as ballast to secure effective traction. This assures larger load handling capacity, less fuel consumption.

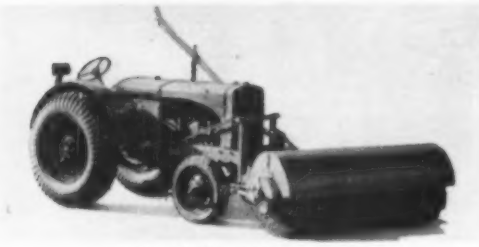
It's an unbeatable combination—Controlled Differential Steering in a correctly balanced tractor equipped with a sure grip crawler track! Ask your Cletrac distributor to demonstrate these features on your job.

14-95 HORSEPOWER **Cletrac** GASOLINE OR DIESEL
Crawler Tractors
Built To Endure

THE CLEVELAND TRACTOR CO. • CLEVELAND, OHIO



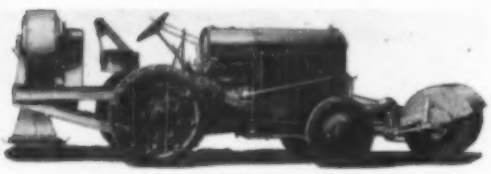
Hough-Universal Sweeper-Blower



Hough Tractor Sweeper

Engine Driven Road Sweeper

Traction Driven Road Sweeper



Hough Tractor Sweeper-Blower

Consider the Cost and You'll Buy a Hough

Five Sweeper-Blower Models from Which to Choose

For sweeping or blowing the dust and fines from bituminous road bases — before applying the prime or seal coat. On black top and other retread jobs, there's nothing that'll save time and cut costs like a Hough Sweeper-Blower; Traction Driven, Tractor or Truck-Towed Models — all do a fast, thorough cleaning job, require a minimum of space and power and are easily operated by unskilled operators.

Hough Sweepers are widely used for all sweeping and clean-up purposes by contractors, municipalities, state and county highway departments.

Get the facts today — send for Bulletins 110, 111 and 113.

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NEWS FROM MANUFACTURERS *About Their Products*

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.

WIRE ROPE SLINGS — **Macwhyte Co.,** Kenosha, Wis. (16 pp., illustrated.) Safe handling of heavy weights with various types of wire rope slings. Adjustable slings of braided wire rope for boxes and crates and bulky loads. Locomotive sling of 114-part braided wire. Special thimbles, links and anchor hooks. Four-leg braided sling equipped with hooks and connected by hook. Drew slings with 68-part flat braided body and special sockets. Crane slings. Photographs illustrate applications in handling big or little loads.

• • •

CRUCIBLE WELD ELECTRODE — **Westinghouse Electric & Mfg. Co.,** East Pittsburgh, Pa. (6 pp., illustrated.) A.C. crucible weld electrodes for every requirement are described in this new booklet, No. 26-650. Included are electrodes: in three grades for low or medium carbon steel welding, brown black and sheet-weld; in two grades for cast-iron welding, casting weld and free machine weld; in two grades for stainless steel; in five grades for hard surfacing; and for manganese steel.

• • •

ARC WELDERS — **Hobart Bros. Co.,** Troy, Ohio. (4-p. folder, illustrated.) Outstanding mechanical features of gas-engine-driven units with ratings, at 40 v. from 200 to 600 amp. Multi-range dual control; stabilization in every welding range; four-pole excitation; end to center ventilation. Portable mountings.

• • •

INDUSTRIAL WASHROOM SERVICE — **Scott Paper Co.,** Chester, Pa. (8 pp., illustrated.) As aid to better industrial relations, this booklet contains suggestions covering rest rooms, mirrors, drinking facilities, floors, soaps, washing, toilets, waste receptacles, ventilation, toilet tissue, tissue towels.

• • •

CONCRETE MIXERS — **Ransome Concrete Machinery Co.,** Dunellen, N. J. (16 pp., illustrated.) New line of 7-S and 10-S mixers embodying 21 special mechanical features, including skip vibrator, two-piece discharge chute, positive water control by spiral cut-off tank, inclosed roller chain drive, and elevating power loader.

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DIESEL ENGINES — **Caterpillar Tractor Co.,** Peoria, Ill. (16 pp., illustrated). Mechanical features of company's diesel tractors, engines and road machinery are described and illustrated in brief sections, each devoted to a separate Caterpillar feature. Owners' letters are included in discussion of diesel starting system, economies of diesel operation, engine simplicity, lubrication, fuel system, dust seals and tracks.

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ELECTRIC TOOLS — **United States Electric Tool Co.,** 2488 West Sixth St., Cincinnati, Ohio. (72 pp., illustrated.) Line includes electric drills in various sizes up to 2 in., equipped with chrome nickel steel gears, ball bearings and air-circulating fan. Hole saw attachments in thirty sizes from ¾ to 5 in. Two-speed sanders and polishers and surfacers. Electric screw drivers and nut setters have reversing switch for operating in either direction of rotation. Portable electric saws, with automatic telescoping safety guard, are made in six sizes, from 6 to 11 in.

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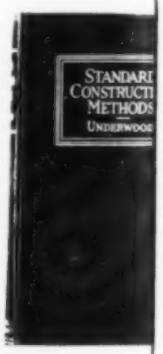

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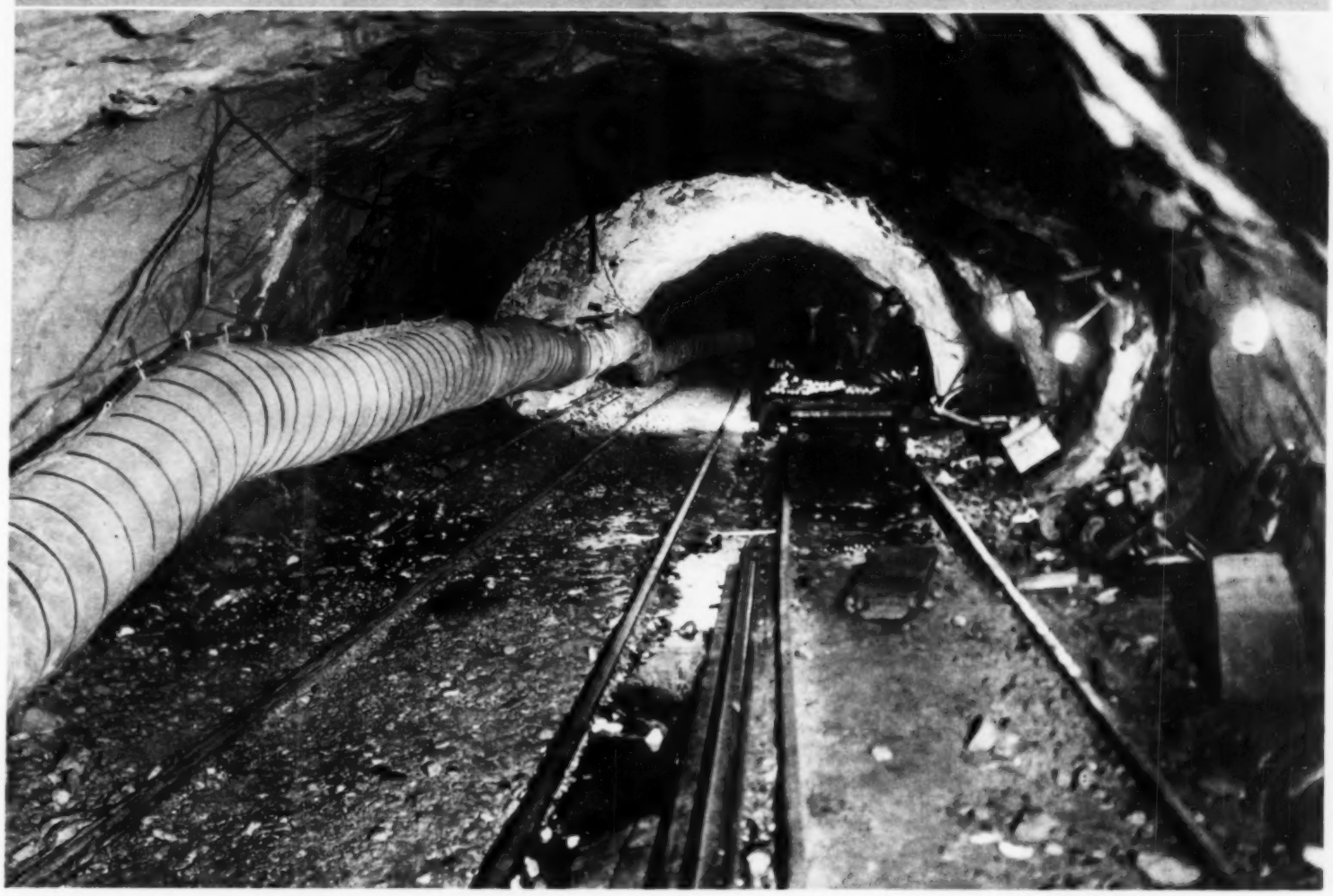

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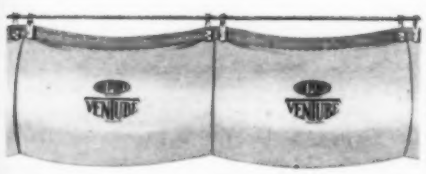

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CALCIUM CHLORIDE AND PORTLAND CEMENT — **Solvay Sales Corp.,** 40 Rector St., New York, N. Y. (48 pp., illustrated.) Discusses effects of calcium chloride on portland cement mixes, covering setting time, early strength and ultimate strength. Shows how calcium chloride affects curing, and why the addition of calcium chloride permits a reduction in water-cement ratio with a resulting increase in density and water resistance. In addition it contains data concerning the marked effects of varying temperatures on the strength of concrete. Two sections of the booklet are devoted to technical facts and three sections to practical information. Structural concrete, paving concrete, and concrete products are each dealt with separately.

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INDUSTRIAL PLATFORM TRUCK — **Elwell-Parker Electric Co.,** Cleveland, Ohio. Two new 4-p. bulletins on power industrial trucks; cover low-lift and high-lift platform trucks. Both trucks have rated capacities of 10,000 lb. and are equipped with controller which allows for four speeds forward and four reverse and with dynamic brakes. The trail axles are of the rocking type. All steering levers are above axle for greater load clearance and accessibility.

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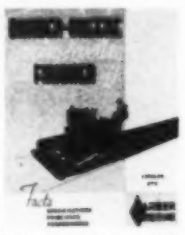
BITUMINOUS FINISHER — **Barber-Greene Co.,** Aurora, Ill. (36 pp., illustrated). Design features, principles of operation and performance data on new machine for ramping, compacting, leveling and finishing bituminous surfaces, including sheet asphalt, without the use of forms. Crown and thickness of material are completely controlled while operating machine. Large capacity receiving hopper holds 5 tons, allowing finisher to work continuously between truck loads. Handles wide range of materials, from sheet asphalt to stabilized mixes. Leveling principle is clearly explained by series of diagrams. Normal 10-ft. width of mat may be reduced 2 ft. by 3-in. increments, while extensions are available to increase width to 12 ft. Machine has heated screed. Descriptive text and numerous photographs illustrate variety of applications to new construction, resurfacing of highways, city streets, and the paving of small areas and odd jobs. Section of catalog deals with materials laid.



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CABLE JOINTS — **General Electric Co.,** Schenectady, N. Y. (16 pp., illustrated.) Gives detailed instructions for splicing and vulcanizing all the principal types of rubber-insulated rubber-jacketed portable cable used in connection with mining machinery, power shovels, dredges or other portable electric equipment. Two methods are included. The first, by the use of solder, is generally considered standard. The second describes a method that is particularly well suited to the types of cable used in mines, where soldering is avoided whenever possible. It covers single- and two-conductor types of cable. The instructions on vulcanizing apply to both methods of jointing.

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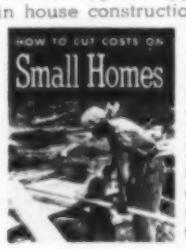
CUTTING COSTS ON SMALL HOMES — **Skilsaw, Inc.,** 5033 Elston Ave., Chicago, Ill. (8 pp., illustrated). Typical applications of electric hand saws in house construction are described and illustrated. They include the making of concrete forms, cutting lumber, trimming doors and sash, notching rafters, channeling ceilings for conduit and cutting various building materials other than lumber. Skilsaws are produced in nine models, with sizes for every kind of sawing job up to units for handling lumber 4⅝ in. thick in one cut.



ELECTRIC BATTERIES — **B. F. Goodrich Co.,** Akron, Ohio. (8 pp., illustrated.) Heavy-duty batteries for starting motor trucks and diesel engines. Construction features are explained and complete specifications and plate dimensions given for each of the batteries offered for a specific service. Battery life increased by porous spun glass separators on both sides of positive plates. New type cell covers show proper level for filling. Battery size range is from 6 to 12 volts.

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SELF-LOCKING TRACK BOLT — **Dardelet Threadlock Corp.,** 55 Liberty St., New York, N. Y. (1-p. folder.) Illustrates track bolt with self-locking thread and free running nut. No lock washer to handle. Positive locking takes place when nut is tightened against work; continued wrenching forces tapered crest of nut thread over tapered and stepped root of bolt thread into locked position. Nut can be removed with wrench.

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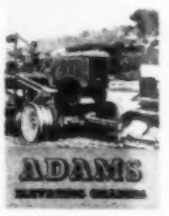
ROAD BUILDING EQUIPMENT — **J. D. Adams Co.,** Indianapolis, Ind. (16 pp., illustrated.) Condensed catalog covering motor graders, leaning-wheel graders, elevating graders, road patrol machines, terracers, retread pavers, multiple-blade maintainers, plows and scrapers. Leaning-wheel models in largest sizes have all-welded, box-type frames, 12-ft. blades, and power-operated controls. Motor graders have tandem drive and leaning front wheels. Retread paver has four sets of mixing blades and adjustable rear spreader blade.



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WELDED DIPPER — **Pettibone Mulliken Corp.,** 4710 West Division St., Chicago, Ill. (6-p. folder, illustrated.) Extra yardage of power shovel production is claimed by makers of all-welded Pioneer dipper, weight of which is reduced by use of high-strength alloy steels. Sizes from ½ to 30 cu.yd. Features include one-piece renewable manganese steel front, abrasion-resisting body plate, smooth inside door

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JACKS — **The Buda Co.,** Harvey, Ill. (Two 4-p. bulletins illustrated). In these two bulletins, Nos. 946 and 949, are illustrated and described the company's (1) hydraulic jacks, in capacities from 1½ to 20 tons and (2) builders' and contractors' heavy-duty, all-purpose jacks in capacities up to 15 tons. Hydraulic jack has centered lever socket so that jack can be positioned by lever without tipping. Contractors jacks include an automatic-lowering unit of 15 tons capacity, single and double-acting ratchet jacks, shoring jacks, push and pull jacks, trench braces and ball bearing journal jacks.

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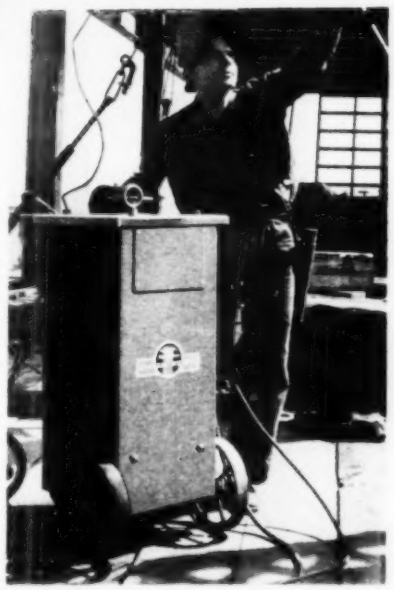
RIGGERS' HANDBOOK — **Broderick & Bascom Rope Co.,** 4203 North Union Boulevard, St. Louis, Mo. (95 pp., illustrated). Illustrates wide variety of types of wire rope slings and special fittings, including sockets, links, rings, hooks, thimbles and shackles. Practical suggestions cover correct ways to apply wire rope clips; seize wire rope; uncoil wire rope to avoid kinking; how to attach wire rope socket; how to make splices. Advice is given on proper selection of guy lines and how to calculate load on them. Several pages deal with tackle blocks. A section is devoted to Murray plaited safety wire rope slings for handling heavy loads.



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J S Maddox

Saving in First Cost of Model "S" New 64 H.P. Gas Tractor, Is Enough to Buy Fuel for Year's Operation

Take a look at these figures. The price of the gas "S" is $800 below that of any Diesel fuel tractor in the 60-70 H. P. class. Suppose 70 octane gas sells for 15 cents* a gallon. Then:

5,333 gallons
15¢ / $800 Maddox Construction Company (see letter) uses 3½ gallons** per hour:

1,523 working hours
3½ / 5,333

1,523 hours = 190 eight-hour days.

In addition, that lower first cost assures you lower interest, taxes and insurance rates — lower depreciation costs — lower costs per yard of dirt moved. You get a big, fast-moving 64 H. P. tractor that works at speeds up to 6.37 miles per hour — half a mile faster than the next fastest tractor in its power class. And it's a tractor with plenty of power for handling 7 and 8-yard scrapers, 12-foot blade graders, 10-yard wagons, bulldozers, trailbuilders and winches. Gain yourself a year's gas supply NOW. Ask your Allis-Chalmers dealer to demonstrate the Model "S" on your job.

YOU GAIN 3 WAYS WITH THE GAS "S"

On Ownership

Lower first cost. Lower insurance rates, interest, taxes and depreciation. Higher trade-in value.

On Operating Costs

Low fuel consumption. No extra-cost, premium lube oils required. New type rollers and front idlers reduce roller lubrication costs from 12c down to as low as 2c per hour.

On Maintenance

Smoother power reduces wear. Gas engine simplicity reduces parts cost. New type rollers and front idlers last longer.

ALLIS-CHALMERS POWER

TRACTORS — IT DOESN'T COST .. it Pays! — ENGINES, ROAD MACHINERY

TRACTOR DIVISION — MILWAUKEE, U.S.A.

* *Prices in most states run from 10 to 12c*

** *Plenty of "S" owners report fuel consumption of 3 gallons and under per hour.*